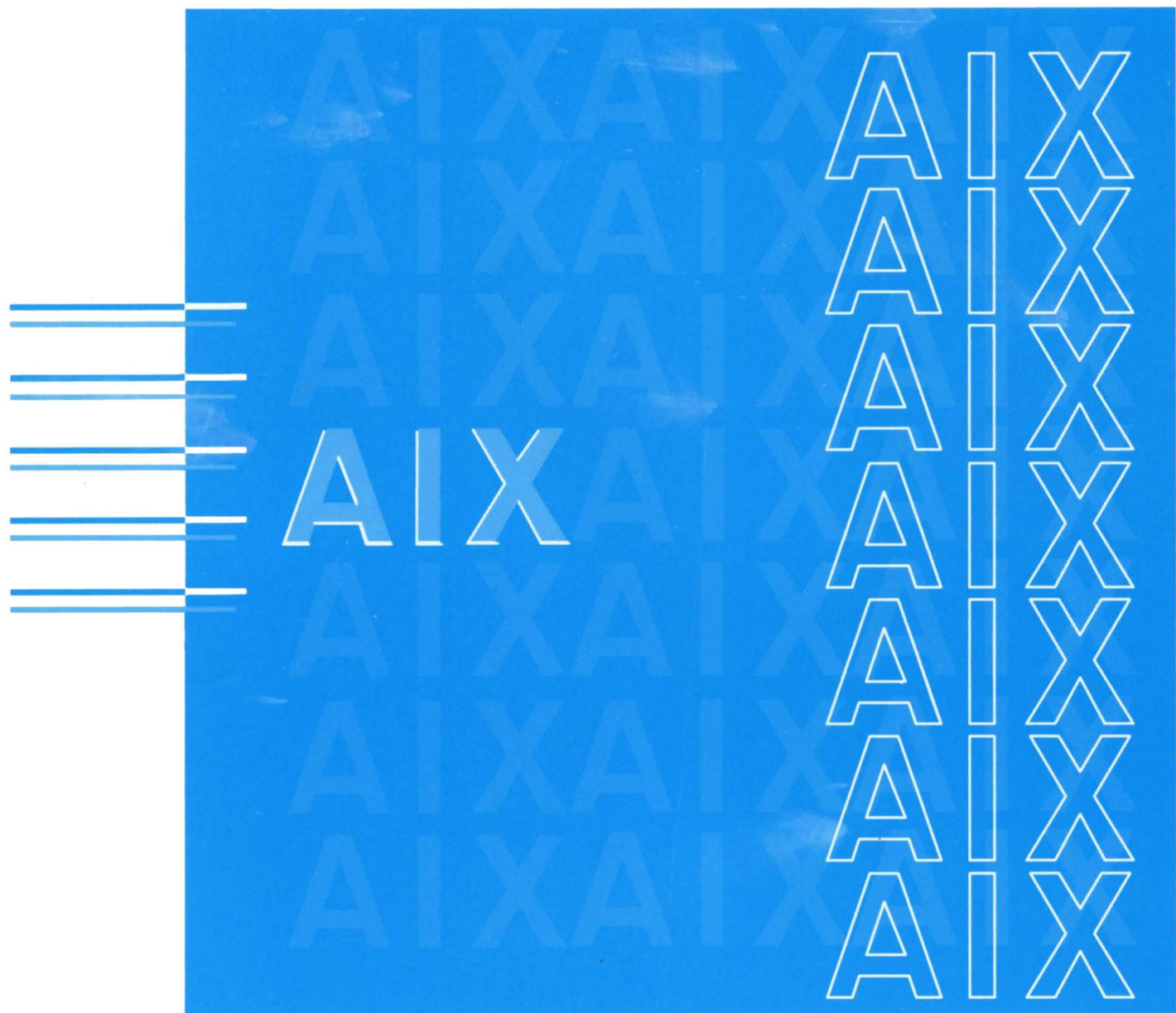


AIX Access for DOS Users
Administrator's Guide



AIXTM Access for DOS Users Administrator's Guide

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About This Book

This manual explains how to install and administer the LAN and RS-232 versions of the AIX Access for DOS Users software on a host computer running an AIX operating system with TCP/IP networking services. It covers thoroughly the system administrator's responsibilities for installation and day-to-day operation and maintenance of the Access program software. For information on the operation of the Access program from the user's point of view, refer to the *AIX Access for DOS Users User's Guide*.

The Access program software allows integration of personal computers into an AIX operating system computer network. Features of this integration let you:

- Run DOS applications while using the file and print services of one or more AIX operating system hosts as if the hosts were local fixed disks.
- Execute AIX operating system commands from DOS on a personal computer.
- Conduct an AIX operating system session on a host computer, using your personal computer as if it were a terminal.

The host computer can support a network of personal computers including any of the IBM[®] personal computer line (PC, XT, and AT) or the IBM PS/2[™] line.

Throughout this manual, the term "personal computer" refers to any of the personal computers listed above. The term "host" refers to an AIX operating system. The term "host" can also refer to a computer running an AIX operating system. The term "DOS" refers to the IBM Disk Operating System program (PC-DOS[™]) (Version 3.10 or later).

The term "LAN" means local area network and refers to a connection path from your personal computer to a host via a network such as Ethernet[™].

Who Should Use This Manual

This manual is written for the Access program system administrator—the person who manages the day-to-day operation of the system. The system administrator should also read the *AIX Access for DOS Users Host Installation Guide*, which provides complete instructions on installing the Access program on the host system.

This guide assumes that you are familiar with AIX operating system commands, code sets, and basic system administration activities such as mounting a tape, making directories, adding users, and booting the host computer. It also assumes that you are familiar with the information contained in the *AIX Access for DOS Users User's Guide*. Familiarity with basic DOS commands and with your network hardware is useful but not required.

Typographic Conventions

This guide uses several typographic conventions to help you distinguish between DOS and AIX operating system commands and file names and to help you recognize text that you must type exactly as shown. These conventions are:

- References to AIX operating system commands and file names are in bold (for example, **lpadmin**). DOS commands and file names are in uppercase (for example, **DIR D:\UNBOB**).
- Examples showing exactly what you type use the lowercase Courier font for both DOS and AIX operating system commands:

```
on d: mv \u\mary\messagetoall \u\mary\message
```

- Italics indicate generic information for which you should substitute actual values for your system. For example, the following means you should supply the names of the source and target files to be used by the AIX operating system **mv** command:

```
on d: mv file1 file2
```

- The path separator and switch character are the slash (/) and hyphen (-) in the host environment, and the backslash (\) and slash (/) in the DOS environment, respectively.
- Prompts are shown (in bold) only in examples that might be confusing without them.
- Examples do not explicitly show carriage returns. It is assumed that you type a carriage return at the end of each line.

Organization Of This Manual

This manual has six chapters and one appendix as follows:

Chapter 1. Introduction acquaints you with the Access program software and configuration requirements for your host computer.

Chapter 2. About AIX Access for DOS Users describes the operation of the Access program software in more depth and discusses aspects of the DOS environment with which the administrator may not be familiar.

Chapter 3. AIX Access for DOS Users Networks discusses the networks that support the Access program operation.

Chapter 4. AIX Access for DOS Users Administration tells you how to get started with the administration of the Access program, how to support day-to-day operation of the Access program, and how to tailor your host system to better suit the way your system is used.

Chapter 5. The Access Program System Architecture is a thorough description of the system architecture for the experienced administrator who wants to know more about the Access program operation.

Chapter 6. Problem-Solving Tools suggests some trouble-shooting procedures for you to follow when the Access program users experience problems they can't solve themselves.

Appendix A. AIX Access for DOS Users Messages lists and explains most of the error messages you might receive from the Access program.

Related Publications

1. Other Access program publications:
 - *AIX Access for DOS Users User's Guide*
 - *AIX Access for DOS Users Host Installation Guide*
 - *PCILIB (AIX Access for DOS Users Extended Library)*
2. AIX operating system publications:
 - *Managing the AIX Operating System.*
 - *Using the AIX Operating System.*
 - *Administration Guide.*
 - *The AIX Operating System Commands Reference, Vol. 1 and 2.*
 - *Installing and Customizing the AIX PS/2 Operating System.*
 - *Installing and Customizing the AIX/370 Operating System.*

about this book

3. Personal computer hardware publications:

- Personal Computer *Guide to Operations*
- Personal Computer *Quick Reference*
- Personal System/2 *Guide to Operations*
- Personal System/2 *Quick Reference*

4. Personal computer software publications:

- Personal Computer *Disk Operating System*
- *DOS Technical Reference*

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introduction

AIX Access for DOS Users

The AIX Access for DOS Users software package allows you to bridge the gap between your personal computer and hosts running an AIX operating system. With the Access program and either an RS-232 or a LAN connection to a host, you can run DOS applications using data from the host file system. You can store files and DOS applications on the host and access them just as if they were on a local fixed disk.

When you use the host file services of the Access program, the file security capabilities of the host system allow you to share files throughout a personal computer network while protecting your files from unauthorized access. You can also take advantage of shared host resources, such as a laser printer.

Additionally, you can use the Access program to enable a personal computer to emulate a VT220 terminal, allowing you to conduct a regular AIX operating system session.

For all its power, the Access program is remarkably simple to use. DOS users need to know nothing about the host system to use host file services. They just treat the host system as an enhanced disk drive connected directly to their personal computers. Users familiar with both the DOS and AIX operating systems can combine host file services and terminal emulation, toggling back and forth between the two modes. For example, you could create a text file in host file services mode using a DOS word-processing package, then switch to terminal emulation mode to include that file in an AIX operating system mail message.

NLS Capabilities

The Access program features National Language Support (NLS) capabilities. With NLS, the Access program users can transfer text files between DOS and AIX operating systems regardless of the local language used.

Since different computers and terminals in different countries have different keyboard layouts, an operating system must provide a way to translate the key you press into an appropriate internal character representation, or glyph, for the local language. DOS uses a variety of tables called *code pages* for this purpose, while AIX operating systems use a different variety of tables called *code sets*.

The Access program with NLS translates between code pages and code sets so that, for the most part, characters created under one operating system display the expected glyphs under the other operating systems even though those characters may be stored differently on each operating system.¹

¹For more information on how DOS code pages work, refer to your DOS manual.

Requirements

Host And Network Requirements For LAN-Based Communication

To use the the Access program software over a LAN, you must have the following:

- One or more host computers.
- An AIX operating system, with TCP/IP service available.
- One LAN controller card for each host.
- Enough LAN cable to connect the host and personal computers.
- Appropriate adapters to connect the LAN board, the LAN cable, and the transceiver (if used).
- Terminating resistors (or "terminators") for the ends of the network cable.

Host Requirements For RS-232-Based Communication

To use the Access program software over RS-232, you must have the following:

- One or more host computers, equipped with intelligent serial cards.
- An AIX operating system.
- One RS-232 port for each personal computer connected.
- Each personal computer connected via RS-232 requires an RS-232 cable with appropriate connectors to attach to an RS-232 port on the host and to an asynchronous communications adapter in the personal computer.

Personal Computer Requirements

- One or more IBM personal computers (PC, XT, or AT) or IBM PS/2 personal computers configured as described in Chapter 1 of the *AIX Access for DOS Users User's Guide*.
- If installing for a LAN, a network interface board, as described in Chapter 1 of the *AIX Access for DOS Users User's Guide*.

- The Access program personal computer software, contained on the Access program distribution diskette.
- PC-DOS, Version 3.1 or later.

Installation Of Adapters In The Host

For the Access program service, install the LAN controller card in your host according to the card manufacturer's instructions. Asynchronous communications boards for RS-232 service should be installed according to the instructions in your host system *Guide to Operations* or in the product manual for the adapter.

Note: The host computer must be configured with an intelligent serial board to support both RS-232 and LAN communications.

Installing AIX Access for DOS Users

The Access program host-side distribution tape or diskette contains all the files required for your host to support the Access program. It also contains an installation program that simplifies the installation process. Before reading further in this manual, you should read and follow the instructions in the *AIX Access for DOS Users Host Installation Guide*. Once the Access program is installed on your host, it is automatically initialized whenever you boot the host system.

This guide assumes that you have installed the Access program exactly as described in the *AIX Access for DOS Users Host Installation Guide*.

The Access Program System Configuration

The maximum number of personal computer users that an Access program network can support depends on several factors. The number of Access program RS-232 users is limited by the RS-232 hardware installed in your host. (The RS-232 hardware required by the Access program is the same as RS-232 hardware required for standard asynchronous terminals.) The number of simultaneous Access program terminal emulation sessions allowed is limited and varies from installation to installation.

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If you use a LAN, performance is likely to be the primary consideration bearing on system configuration. We cannot recommend a specific maximum number of personal computers for your Access program network because of the variables that affect performance. Here are some issues you should consider when designing your network:

- Host systems with greater processing capacity can support more Access program users.
- Typically, Access program file service users place a lower load on the host system than standard terminal users performing similar operations.
- Typically, Access program terminal emulation users place a somewhat heavier load on the host system than standard terminal users performing similar operations.
- Performance over a LAN is better than performance over RS-232.
- System response depends on the number and type of applications being used.
- Typically, there is a limit of 2000 personal computers that can be connected to the host.
- The system usually limits the number of open network connections.

Refer to "Tailoring Your AIX Access for DOS Users System" in Chapter 4 for more information on performance issues. Refer to AIX documentation for host limitations.

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Introduction

This chapter discusses the operation of AIX Access for DOS Users and describes the two major Access program services as well as the Access program utilities that enhance the interface between the DOS and AIX operating systems. The discussion here is introductory. You should also be thoroughly familiar with the description of the Access program in the *AIX Access for DOS Users User's Guide* to effectively administer the Access program system. Some comments on the DOS environment are included at the end of this chapter for administrators who are not familiar with DOS.

Host/Personal Computer Integration

When the network hardware and software are installed, users can easily access both host (AIX operating system) and personal computer (DOS) resources. The Access program supplies two major services that integrate network hosts and personal computers, as well as a number of special-purpose utilities that enhance the interface between DOS and an AIX operating system. These services and utilities are described briefly below.

Host File Service

When you log into the Access program from your personal computer, you have access to the same files as you do when you access the host in any other way. These files are available to DOS on a virtual drive that is specified by the Access program in the LOGIN connection message. From the user's point of view, the virtual drive has the characteristics of a local DOS drive attached to the user's personal computer. With the Access program the user can:

- Create or access files on the virtual drive using DOS commands or applications by specifying the virtual drive identifier as part of the file name.
- Change the default drive to the virtual drive.
- Copy files from diskette or local fixed disk to the virtual drive following the same procedures used to copy to a local disk.
- Execute noninteractive host processes from DOS.
- Print DOS files on a remote printer.
- Create directories on the virtual drive using the DOS MKDIR command.
- Set DOS search paths that specify directories on the virtual drive.

Terminal Emulation Service

The Access program software enables a personal computer to emulate a standard VT220, VT100, or PC Scancode terminal. Personal computer users can therefore connect to the host and conduct standard interactive host sessions as though they were using terminals rather than personal computers running DOS. The advantages of using terminal emulation are 1) users more familiar with an AIX operating system than with DOS can work in the environment with which they are comfortable, and 2) all users have access to AIX operating system commands that are not directly accessible from the DOS environment.

Users can freely intermix file service and terminal emulation sessions. The Access program allows you to suspend your work with either service at any time and switch to the other service. Unless you explicitly terminate your current service, you will find any ongoing jobs in the state you left them when you return to that service.

The Access Program Utilities

The Access program provides several utility programs that enhance the user interface between DOS and AIX operating systems, as listed below. All of them are supplied on the Access program personal computer distribution diskette and can be invoked from the DOS environment of the personal computer. CHARCONV, AIX2DOS, and DOS2AIX are also supplied in versions that run on an AIX operating system.

- CHARCONV, DOS2AIX, and AIX2DOS convert text files from DOS text format to AIX operating system text format and vice versa and convert between the AIX operating system code set and the DOS code page.
- ON executes AIX operating system commands on the host computer.
- JOBS displays the job table of ON-initiated host tasks, clears it of completed tasks, and reattaches the DOS console to detached tasks.
- KILL terminates ON-initiated jobs.
- PRINTER directs DOS printing to a local (personal computer) printer or a remote (AIX operating system) printer.
- UDIR lists files and directories on the virtual drive in a combination of DOS and AIX operating system formats.

For information on the Access program utilities of special interest to the system administrator, refer to Chapter 4.

The DOS Environment

As system administrator, you should be familiar with an AIX operating system—including commonly used commands, files, messages, and procedures. Some familiarity with the DOS environment is also helpful. Following are brief definitions of some common DOS terms used in this guide. For more information on the DOS environment, refer to the related publications listed in the preface.

Application software: Programs designed for specific purposes, such as accounting or word processing, and generally commercially distributed.

Code page: A table computers use to translate numeric values into letters, numbers, symbols, and other characters you can recognize. DOS code pages basically perform the same function as code sets do in an AIX operating system. Different languages use different code pages. Computers manufactured in the United States use code page 437 by default. For more information on code pages, refer to your DOS manuals for version 3.3 or later.

Disk: Loosely, a magnetic disk. In this guide, the term *disk* specifically refers to a fixed disk, as opposed to a diskette. (See also *fixed disk*.)

Diskette: A thin, flexible, magnetic disk permanently enclosed in a semirigid protective jacket. Synonymous with flexible disk and floppy disk.

Distribution diskette: One of the diskettes packaged with the *AIX Access for DOS Users User's Guide* containing the Access program personal computer software. (The Access program *host* software is distributed on either a distribution diskette or a distribution tape—depending on the particular host system—and is packaged with the *AIX Access for DOS Users Administrator's Guide*.) (See also *working diskette*.)

DOS drive: The personal computer hardware associated with DOS diskettes or fixed disks. DOS drives are named with letters followed by a colon. By convention, diskette drives are usually designated A: and B:, and a local fixed disk is designated C:. The contents of the disk or diskette on each drive are presented to the DOS user as separate file systems (each having its own root), unlike an AIX operating system, which presents the contents of mounted drives as part of a single, integrated file system. (See also *DOS volume* and *virtual drive*.)

DOS executable files: DOS executable files are invoked by name, like executable files on an AIX operating system. DOS, however, requires executable files to end with one of the three-letter extensions .BAT, .COM, or .EXE. (For example, executable files familiar to DOS users include AUTOEXEC.BAT and COMMAND.COM.)

.BAT files are equivalent to AIX operating system shell files—they are text files containing a list of DOS commands that are executed when the file is invoked. AUTOEXEC.BAT is a special file contained in the root directory of the fixed disk or the Access program

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working diskette that is executed automatically whenever the personal computer is booted. .COM and .EXE files are machine-readable DOS programs that DOS recognizes and distinguishes on the basis of the file name extension (.COM or .EXE) and internal format.

DOS search path: The directories searched by DOS for commands and files. The DOS search path is analogous to the AIX search path, except:

- Under DOS, the current directory is *always* searched first.
- DOS search paths can include different DOS drives, each containing an independent file system.

DOS volume: The contents of a DOS disk or diskette. DOS allows you to identify the contents of a disk or diskette with a volume label (see the descriptions of FORMAT, VOL, and LABEL in your DOS manual). *Volume* is sometimes used interchangeably with *drive*, but *drive* more precisely refers to the personal computer hardware associated with a disk or diskette. (See also *DOS drive*.)

Fixed disk: A rigid magnetic disk housed in either the system unit or an expansion unit of a personal computer, used for mass storage.

Function keys: Special keys on the personal computer keyboard that perform tasks normally requiring more than one keystroke or tasks that cannot be performed with keys representing standard characters. The function keys are labeled F1 through F10 for standard keyboards and F1 through F12 on enhanced keyboards.

Virtual drive: Any one of the drives used to access a host through host file services. The Access program LOGIN command identifies the drive (by drive letter) when the user logs into the Access program. These drives are called *virtual* because they don't use the hardware of a local DOS drive but can be treated as though they did. (See also *DOS drive*.)

Working diskette: The diskette from which DOS is booted and from which the Access program software is loaded. (If these programs are on the fixed disk, no working diskette is needed.) The Access program user creates the working diskette by combining the DOS system files with the contents of the Access program distribution diskette. (See also *distribution diskette*.)

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Introduction

This chapter describes the functional characteristics of the LAN and RS-232 hardware and software as they relate to the AIX Access for DOS Users system. For further general information on network administration, consult appropriate LAN and host system hardware documentation. Network administration required specifically for the Access program is covered in Chapter 4.

LAN Characteristics

A LAN (such as Ethernet) is a high-bandwidth, low-delay communication medium and link-level data transmission protocol that allows a computer to send packets of data to other computers. The maximum bandwidth of a LAN is typically 10 megabits per second. The bandwidth is shared by all computers using the network. Depending on which drivers are configured into your system, the LAN may use either the XEROX[®] protocols or the IEEE 802 protocols.

The Access program software uses a LAN, when selected, for all data traffic between the personal computer and the host system.

For use with terminal emulation, the Access program software creates special virtual serial lines over the LAN between the personal computers and the host. These virtual serial lines operate independently of and concurrently with the Access program file-sharing mechanism.

Host LAN Hardware And Software

The host LAN controller gives the host the ability to communicate over a LAN. The controller is a board that plugs into the host backplane and is accessible under kernel control using the host LAN driver.

The LAN driver provides the interface between the LAN hardware and the various processes that use the LAN. It can handle a fixed number of *network ports*, or logical connections. Each network port has a set of *input buffers* associated with it, where incoming packets are temporarily placed until a process asks for them. Each network port can be independently opened and have reads and writes performed on it. The driver is responsible for demultiplexing incoming LAN packets and placing the packets into input buffers reserved for the various network ports based on a data field in the packet or on the network address.

The network can support multiple high-level protocols simultaneously.

Personal Computer LAN Hardware And Software

Personal computers running the Access program can use any of a wide range of network interface boards. A complete list of the currently supported boards appears in the *Release Notes*.

The board plugs into a personal computer expansion slot according to instructions contained in the manufacturer's documentation. It is accessible from the Access program software via the Access program LAN driver software. The Access program LAN driver is the interface between the LAN hardware and the rest of the Access program software. The driver is interrupt-driven and tuned for maximum network performance. It performs a demultiplexing function for the Access program software, allowing flexibility of operation and greater system performance.

RS-232 Characteristics

RS-232 is a low-bandwidth, point-to-point communication medium and data transmission protocol that supports data transfer between two computer systems. Typical RS-232 bandwidths are under 10 kilobits per second.

The Access program uses the host system's terminal ports in the same manner as a normal terminal would. No physical RS-232 lines need be reserved for the Access program service. While file service is being provided, the Access program uses a simple frame-based communications protocol with moderate-sized packets. For the sake of performance, whenever terminal emulator traffic is encountered, the protocol is switched to a much lower overhead method, so that single-character transmissions do not require sending a large number of bytes. Users can arbitrarily intermix terminal emulation and file service messages.

Multiple Hosts And Networks

The Access program host software can support multiple simultaneous personal computer users. Each concurrent personal computer user is handled independently of all others. The only limits are those imposed by the operating system and by the Access program license agreement. The operating system may limit the number of processes in the system and the number of simultaneous network connections allowed.

The Access program host software can also simultaneously support both LAN and RS-232 connections with personal computers. Because the host software is designed to handle LANs and RS-232 independently, your Access program system can use a LAN, RS-232 only, or both a LAN and RS-232 at once.

The Access program networks using a LAN can have multiple hosts as well as multiple personal computers. The Access program personal computer users can access any host on the network for which they have an account.

The Access program personal computer user can connect to more than one host at a time. If the personal computer is connected to a network that includes more than one host, the user can change from one host to another simply by changing drives.

The Access program personal computer software supports both RS-232 and LAN connections. If the personal computer has the necessary hardware for both media, the user can choose either medium for an Access program session.

TCP/IP Networking

The Access program uses a subset of the standard DARPA Internet Protocol (IP) and User Datagram Protocol (UDP) for communication between network hosts and personal computers. IP routes packets between computers, whereas UDP provides simple process-to-process datagram service based on IP.

Internet Addresses

All hosts and personal computers on the network must have unique internet addresses at which they can receive data. An internet address is a 32-bit (4-byte) numeric value that specifies a particular network and a particular machine on that network.

Internet addresses are specified in a standard format of four fields separated by periods—for example, 72.235.82.101 (decimal values). Each of the four fields represents one byte of the complete internet address.¹

To allow flexibility in interconnecting multiple networks and multiple machines within a network, internet addresses can use one, two, or three of the four fields to specify the network. The portion of the internet address not used to specify the network is available to specify a particular host within that network.

¹Internet addresses can also be specified in octal or hexadecimal notation, using the standard convention of leading zero to imply octal and a leading 0x or 0X to imply hexadecimal.

Refer to *AIX Access for DOS Users Host Installation Guide* Host Installation Guide for information on setting internet addressess.

Physical Address Mapping

Network addresses are unique addresses that are physically encoded in each network adapter board in both the host and the personal computer. The network address is assigned by the hardware manufacturer and cannot be changed after the board is manufactured. The TCP/IP protocols use the network address to identify each machine on the network. When a personal computer communicates with hosts, the network address of the adapter board in the personal computer is transmitted to the hosts along with the internet address. The network hosts map the transmitted internet address to the network address and retain this information in a table. When any host needs to transmit data to a particular personal computer, the host refers to the table mapping internet addresses to network addresses. The host identifies the personal computer to which it addresses data based on the correlation of the internet and network addresses.

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Introduction

This chapter discusses managing your AIX Access for DOS Users system. The topics are organized in three sections, as follows:

- **Getting Started with the Access Program:** starting and stopping host servers, assigning internet addresses to personal computers, and adding and removing Access program users.
- **Supporting the Access Program Operation:** administering network printers, managing the Access program host processes, backing up system data, copy protection, file sharing and record locking, and error messages.
- **Tailoring Your Access Program System:** managing host disk resources and load, establishing shared personal computer software libraries, AIX operating system permission modes, enabling and disabling terminal emulation ports, DOS software compatibility issues, and limitations.

To support everyday operation of the Access program system, you must be familiar with the topics discussed in the first two sections. The final section, "Tailoring Your Access Program System," tells you how to customize and configure your host to suit the needs of your installation.

Getting Started With AIX Access for DOS Users

Starting And Stopping Host Servers (Daemons)

Once the host software is installed according to the instructions in the *AIX Access for DOS Users Host Installation Guide*, the Access program is operational each time you boot the host system. Occasionally, you may need to stop the Access program operation—for example, to change the default **umask** by modifying **/etc/rc.pci**. You can stop the Access program without shutting down the entire system. To resume the Access program service, you can use a special utility for restarting the Access program daemons or you can reboot the host system.

The utilities **/etc/rc.pci** and **/usr/pci/bin/pcistop** start and stop the Access program LAN daemons **/usr/pci/bin/pcimapsvr.ip** and **/usr/pci/versions/3.2/pciconsrvr.ip**. (For a more complete explanation of these utilities, refer to Chapter 5.) Whenever you intend to stop the Access program service, you should inform all Access program users who are currently logged in that service is about to be terminated. The **pcistop** utility does not stop the Access program RS-232 processes. To stop them, the Access program RS-232 users should log out. If necessary, you can kill the Access program RS-232 processes manually by running **ps -ef** on the host to find out the process ID (pid) of any currently executing Access program processes. Look for any processes in the **ps** list that start with **pci** and kill the relevant pid.

To stop the Access program service, follow these steps:

1. Inform all users currently logged in, that service will be terminated.
2. Invoke `/usr/pci/bin/pcistop`.

To resume the Access program service, either invoke `/etc/rc.pci` or, if the system was shut down, reboot.

Assigning Internet Addresses To Personal Computers

Note: If you are running the Access program over RS-232 only, skip this section.

The Access program networks with hosts running an AIX operating system with TCP/IP networking services use the DARPA UDP/IP protocols for communication between network hosts and personal computers. For these protocols to work properly, all personal computers and hosts on an Access program network must have internet addresses that are both compatible and unique. Assigning internet addresses to hosts is discussed in the *AIX Access for DOS Users Host Installation Guide*. Personal computer requirements are discussed here.

In general, the term *host* is used in this guide to refer to a host computer running an AIX operating system with TCP/IP networking services and supporting a network of Access program users. The UDP/IP protocols, however, treat *both* computers running an AIX operating system and Access program personal computers as network hosts. The Access program personal computers must therefore have internet addresses that meet the same requirements that apply to any hosts on the network.

The Access program personal computer users must know their assigned internet addresses when they create their Access program working diskettes or install the Access program on their fixed disks. (See Appendix A of the *AIX Access for DOS Users User's Guide*.) The unique internet address associated with each personal computer is stored in a file called `\ETC\HOSTS`, which is created automatically by the Access program `INSTALL` command.¹ The `HOSTS` file has the following format:

```
internet_address host_name localhost
```

Whenever the user establishes an Access program session, the `PCIINIT` program searches the `HOSTS` file for the internet address associated with the host labeled "localhost" and

¹If the personal computer already has a `HOSTS` file and the `HOSTS` variable in the `AUTOEXEC.BAT` file points to the directory containing that file, no new `HOSTS` file is created. The existing `HOSTS` file is used instead. Note that one internet address must be identified as `localhost`.

assigns that address to the personal computer. Assigning internet addresses to personal computers is normally a three-step process:

1. Reserve a block of internet addresses for future assignment to personal computers.
2. Assign a unique address from the reserved block of addresses to each network personal computer as network users are added.
3. Inform users of their internet addresses and assist them as necessary in installing the Access program.

The procedure for reserving a block of internet addresses is described in the following paragraphs. For further information on assigning internet addresses to personal computers, see the next section, "Adding Access Program Users."

Internet address requirements for personal computers are the same as for hosts. Both hosts and personal computers must have:

- Internet addresses in the same class and network.
- Unique host portions of the internet address.

To meet these requirements, follow these steps:

1. Determine the internet address of any AIX operating system host on the Access program network. To do this, login to an AIX host and type:

```
host hostname
```

where *hostname* is the name of a network host. (If you do not know the name of a network host, use the **uname -n** command to determine it.) The system displays the internet address together with the name of the host and (if applicable) any aliases that refer to the host. For example, the system might print:

```
89.0.2.1      host1      happy
```

Note: If any of the hosts on your network have names longer than 14 characters, they appear truncated on the Access program host map. You might want to shorten any such names. Also, all characters after the "." (dot) will be dropped regardless of the length on the host name. For example, a host named `happy.california` will be truncated to `happy`.

The internet address in the example above has a standard format of four numeric fields separated by periods. Make a note of this internet address.

2. Determine the internet address *class* by examining the first field of the internet address and comparing it to the table below:

<u>First Field of Internet Address¹</u>	<u>Class</u>
0-127	A
128-191	B
192-223	C

Our example **host1** address of 89.0.2.1 is a Class A address, since the value of the first field is between 0 and 127.

3. Verify that all hosts are in the same class and network (that is, that they all have the same network portion of the internet address). Depending on the class of the address (which you determined in step 2), the network portion of the address is specified in the first field, the first two fields, or the first three fields of the internet address, as follows:

<u>Network Class</u>	<u>Fields Devoted to Network Portion of Address</u>
A	1
B	2
C	3

Refer to "Assigning Internet Addresses in a Multihost Access Program Network" in the *AIX Access for DOS Users Host Installation Guide* for further information on determining the network portion of the internet address.

Since it is a Class A address, the network portion of our example internet address of 89.0.2.1 is 89. The remainder of the address (0.2.1, in our example) is the host portion of the internet address.

Make a note of the network portion of the internet address used by your network. It will be part of the internet address that you assign to all personal computers using the the Access program network.

4. Determine which internet *host* addresses are available for assignment to personal computers. Since internet host addresses must be unique, you must determine which internet host addresses have already been assigned. The file `/etc/hosts` on any Access program network host should list all internet addresses currently assigned to any network machines. Inspect this file, looking for all internet addresses with the same network portion. For example, you might find that the following internet addresses with a network portion of 89 have already been assigned:

¹Values shown are decimal. Internet addresses can also use octal or hexadecimal notation, using the standard convention of a leading zero to imply octal and a leading 0x or 0X to imply hexadecimal.

89.255.1.1	89.255.1.4
89.255.1.2	89.255.1.6
89.255.1.3	89.255.1.8

In this example, you could reserve for assignment to personal computers any internet addresses that have 89 in the first field and *do not* have values of 255.1.1, 255.1.2, 255.1.3, 255.1.4, 255.1.6, or 255.1.8 for the host portion of the address.

Note that the number of internet address fields devoted to the host portion of the address (and therefore the number of addresses that can be reserved for personal computers or hosts) depends on the class of the network. Class A networks (as in the preceding example) can have as many hosts as can be uniquely addressed in three host address fields. Class B networks limit the number of hosts to those that can be uniquely addressed in two host address fields, and Class C networks limit the number of hosts to the number of unique addresses in a single host address field.

In addition to the requirement for a unique host address and the limitations imposed by network class, the following requirements apply to the host portion of internet addresses:

- The value of each field must be less than 256 (decimal).
- You cannot assign zero or 255 (decimal) to *all* host address fields in an internet address. This means that addresses such as 89.0.0.0 and 89.255.255.255 cannot be used. Equivalent octal or hexadecimal values are also prohibited.

(See the *AIX Access for DOS Users Host Installation Guide* for a more detailed description of these limitations.)

Now consider the previous example in which the six internet addresses 89.255.1.1, 89.255.1.2, 89.255.1.3, 89.255.1.4, 89.255.1.6, and 89.255.1.8 are already assigned to existing network machines. Based on all the requirements that apply to internet addresses, the following addresses are available for assignment to personal computers:

- All addresses between 89.0.0.1 and 89.255.1.0
- 89.255.1.5 and 89.255.1.7
- All addresses between 89.255.1.9 and 89.255.255.254

Make a note of the internet addresses that are available for assignment to personal computers on your Access program network.

5. Reserve a block of internet addresses from the list of available addresses from which you will assign addresses as personal computers are added to the network. This block can be chosen arbitrarily, but you should choose a range that won't conflict with

foreseeable host additions to the network or other existing or planned network interfaces.

In our example, you might reserve the internet addresses between 89.255.255.0 and 89.255.255.254 for assignment to personal computers. This block is clearly distinct from the addresses already assigned to hosts and, with 255 legal values, allows ample room for network growth.

6. Make a note in the `/etc/hosts` file that you have reserved these numbers.
7. If your network is using the domain-name server, make certain its database is modified as well.

Adding Access Program Users

To add new users to your Access program network, follow these steps:

1. Create a user account in whatever is the normal way for your system, usually either via **adduser** or by making an entry in `/etc/passwd` and creating a home directory for the user.
2. Attach the user's personal computer to the host via a LAN or RS-232.
3. If using a LAN, assign an internet address chosen from the block of addresses reserved for personal computers to the user's personal computer. Enter this address in the file `/etc/hosts` and inform the user that he or she should use the assigned address along with his or her personal computer's host name when installing the Access program. Each computer in the network must have a unique internet address.

For example, assume you have reserved the internet addresses from 89.255.255.0 through 89.255.255.254 for network personal computers. The first personal computer to be added to the network would be assigned the internet address 89.255.255.0, the second would be assigned 89.255.255.1, and so on. When you add these addresses to `/etc/hosts`, use the standard format:

internet_address *official_host_name* *aliases*

where *internet address* is the address in the standard four-field format with dots separating the fields; *official host name* is the name of the personal computer being added to the network; and *aliases* (an optional field) is a list of any names other than the official personal computer name by which the machine is known. The "official host names" of your personal computers on the network are arbitrary, but you may wish to establish a meaningful naming convention.

For example, assume the personal computer "pc5" with the internet address 89.255.255.4 is being added to the network. Add the following entry to `/etc/hosts`:

```
89.255.255.4      pc5
```

Any number of spaces or tabs can separate the parts of the `/etc/hosts` entry, and the entry can appear anywhere in the `/etc/hosts` file.

You should be prepared to assist users as necessary when they install the Access program. Refer to Appendix A of the *AIX Access for DOS Users User's Guide* for complete instructions on installing the Access program on personal computers.

Note: Because the Access program hosts associate an internet address with a specific personal computer, it is important for users not to use the same Access program working diskette to boot the Access program sessions on two or more personal computers. If two personal computers are booted from the same Access program working diskette, they both have the same internet address, which violates the requirement that all network machines have unique addresses. To avoid such problems, it is safest to associate an internet address (and therefore a working diskette) with a particular personal computer on the network. If it is necessary to use a working diskette on more than one personal computer, the user should modify the HOSTS file to specify a different internet address before a different machine is booted.

4. When you add users, you may need to enable additional terminal emulation ports. Refer to "Enabling and Disabling Terminal Emulation Ports" later in this chapter.

Removing Access Program Users

You can remove an Access program user from the network in any of the following ways:

- Disable the user's host account following the usual procedure for your system.
- Disconnect the user's personal computer from the network.
- Collect the user's Access program working diskette (and also the Access program distribution diskette).

Once the user's account has been removed, you should perform the same functions you would when removing any account. This would typically include deleting, archiving, or transferring files.

When you remove users, you may also want to disable terminal emulation ports. Refer to "Enabling and Disabling Terminal Emulation Ports" later in this chapter.

Supporting The Access Program Operation

Administering Network Printers

With the Access program **PRINTER** command, users can specify explicit print programs for up to three print streams—LPT1, LPT2, and LPT3. When the user specifies remote printing with no print program in effect for the specified print stream, the Access program automatically spools print jobs from the personal computer to the host printer. The default print program for LPT1 is defined in `/etc/rc.pci`, which is installed with the Access program host software.

As system administrator, you need to be sure that the default settings in the `rc.pci` file are appropriate for your system. In addition, you may want to change the default system printer to suit the needs of your user community.

Changing the default system printer involves editing the `rc.pci` file and then stopping and restarting the Access program to make the change effective. Be sure to warn the Access program users before you run `pcistop` and `rc.pci`. Editing `rc.pci` is described below:

The `rc.pci` file defines two variables, `PRINTPATH` and `PRINTPROG`, as follows:

```
PRINTPATH=/bin:/usr/bin
```

```
PRINTPROG=/usr/pci/bin/printprog
```

`PRINTPROG` is the default print program and `PRINTPATH` is a list of directories the system should search for print programs. The print program specified for `PRINTPROG`, as well as the print programs invoked by the user with the **PRINTER** command, must reside in one of these directories.

Change these variables to specify the desired default print program and search paths.

For example, if you are working in an NLS environment, you need to ensure that printer data gets translated from the appropriate DOS code page. To do this, define `PRINTPROG` as follows:

```
PRINTPROG="/usr/bin/charconv -i %1 -o %2 | print"
```

The `%1` parameter specifies the input code page (for example, `pc850`); the `%2` parameter specifies the output code set (for example, `8859`) for your system.

If you do not define `PRINTPROG`, the server attempts to execute any program in `/usr/pci/bin` called `pciprint`. There is a sample `pciprint` program in the Access program host-side distribution.

When you have edited `rc.pci` to specify the appropriate default print program and search paths, stop and restart the Access program. For further information on administering host printers, refer to your host system documentation.

Managing The Access Program Host Processes

All Access program users who establish terminal emulation or file service sessions cause processes to be executed on the host. When commands are invoked during a terminal emulation session, the host executes these commands just as though they were issued from a terminal connected directly to the host. Managing these processes is no different from managing any other processes invoked from a terminal connected to an AIX operating system.

When file service users execute DOS commands on the virtual drive, the Access program software translates the commands into equivalent host commands and executes them on the host system. In general, the Access program software manages these host processes transparently to the user, and they rarely require intervention by the system administrator.

With the Access program `ON` command, however, the Access program file service users can invoke host processes that are not under the control of the Access program software. A user who is unfamiliar with an AIX operating system might use `ON` inappropriately and start a runaway process—a defective process that consumes host resources and never terminates. If the user cannot terminate the process himself, the administrator should intervene and kill the process.

When necessary, use the `ps` command to determine information about Access program host processes, just as you would to find out about any other host processes. Note that processes invoked via `ON` are not associated with a terminal, so you must invoke `ps` with the appropriate option to display status information for *all* processes.

For example, assume that a user with the user name `fred` has invoked a process `/u/fred/bin/doit` that needs to be killed. To find out the process number that needs to be killed, issue the `ps -ef` command. Among the displayed data, you might see lines similar to this:

```

UID    PID  PPID  C   STIME TTY   TIME COMMAND
fred  346   345  1   Apr 7  ?    9:48 /u/fred/bin/doit

```

From this display you can see that the process you need to kill is number 346.

System Backup Procedures

Standard system backup procedures are not affected by the presence of the Access program software and the Access program user files on the host. The Access program users can, of course, use their personal computers to back up files from the host to their own local disks. However, such procedures should not be used as a substitute for regular backups of the entire host file system done by the system administrator.

Copy Protection

You may have occasion to assist Access program users who have violated the restriction against simultaneous use of multiple Access program disks with the same serial number. The following paragraphs describe the Access program copy protection system and recommend corrective procedures to be used when a user's personal computer is disabled by the copy protection mechanism.

Using the Access program simultaneously from two personal computers requires two Access program disks created from two different licensed Access program distribution diskettes. Users may make backup copies of their distribution diskettes or working diskettes, but they may not use more than one copy at a time. **It is the system administrator's responsibility to ensure that the Access program is used correctly.**

Copy protection prevents the illegal duplication and use of the Access program software. It is illegal to simultaneously operate two or more personal computers with the Access program software derived from one licensed distribution diskette. Each diskette is distributed with some unique data in the BRIDGE.DAT file that must be present in the file for correct operation.

When the Access program system detects two personal computers simultaneously using the Access program disks created from the same distribution diskette, the second personal computer to log in to the Access program is halted with a displayed message stating that a copy protection violation has occurred. This condition can be recovered from by powering off the personal computer and rebooting.

File Sharing And Record Locking

File sharing means that while one user has a file open, no other user can access it; the file is "locked." By contrast, record locking means that rather than a whole file being locked when one user accesses it, only the record (or, depending on the application, the group of records) being used is locked.

For example, a networked word-processing program prevents two users from modifying the same file at the same time (file sharing), whereas a networked database management program lets two or more users access the database file at once but prevents simultaneous record access (record locking).

How and whether a particular application implements file sharing or record locking is application dependent. For instance, one application may not lock records at all, another may lock only the record that is being accessed, and a third application may lock all records from the one in use to the end of the file. Some stand-alone applications lock files; others do not. If an application is designed to open a file, make its own copy of that file to work on, and close the file, then the file is not locked. However, if the application keeps the file open, then it usually locks it to other users. Attempts to access a locked file yield either an "Access denied" or "File locked" error message.

A file set to read-only mode with the DOS ATTRIB or CHMOD commands is always open to reading, although nobody can write to it. For this reason, we recommend that program files (used to execute commands) be set to read-only to avoid conflicts in their use.

File-sharing and record-locking capabilities are built into the Access program and become available automatically when the Access program is installed and booted. File sharing and record locking use host shared memory and semaphores for their operation.

The Access program supports DOS 3.10 file sharing and record locking used by many networked DOS applications. If a choice of network types is offered when installing networked applications, we recommend that you first choose "IBM PC Network" or another MS-NET compatible network type. However, you may have to experiment with other network types to find the one that best supports file sharing and record locking for a particular application.

If you have problems with file sharing or record locking, refer to Chapter 6, Problem-Solving Tools.

The Access Program Error Messages

The Access program host software responds to all serious and fatal Access program error conditions by displaying an error message on the host system console and mailing the message to root. Refer to Appendix A of this guide for a list of these messages and recommended recovery procedures.

Tailoring Your Access Program System

As soon as you install your Access program system, users can begin to enjoy the host resources made available by the Access program file service, terminal emulation, and the special Access program utilities. No special configuration of the Access program system is required. As you become familiar with the Access program operation, however, you may want to tailor the system to accommodate the way you and the system users prefer to use the system. This section offers tips on the following topics:

- **Managing Host System Disk Resources and Load:** Issues concerning the host resources required for the Access program use.
- **Establishing Shared Personal Computer Software Libraries:** How to store DOS utilities and application programs on the host.
- **AIX Operating System Permission Modes:** How to alter the default read, write, and execute permissions assigned to files created with the Access program.
- **Enabling and Disabling Terminal Emulation Ports:** How to increase or decrease the number of terminal emulation sessions supported by your host.
- **DOS Software Compatibility Issues:** Technical requirements for DOS software to operate concurrently with the Access program.
- **DOS Limitations:** Limitation when using the Access program.

Managing Host System Disk Resources And Load

Although the Access program system requires no special procedures for managing host system disk space, you should advise inexperienced users that they are sharing a disk with other people and that they should conserve disk space. If your Access program system uses multiple hosts, you can use them to your advantage by distributing user accounts among the different hosts so that resource consumption (system load and disk space use) on the different machines is about equal.

The task of load management on the Access program hosts is essentially the same as for any host computer. Every Access program user puts some load on the host, just as each user who is logged directly into an AIX operating system does. Terminal emulation puts more of a load on the host than file service does, so you may want to limit the number of simultaneous terminal emulation sessions allowed. (See "Enabling and Disabling Terminal Emulation Ports," later in this chapter.)

The Access program allows users the flexibility of alternating between local work (done on a local diskette or fixed disk) and remote work (done on the host virtual drive). The load on the remote machine is heavier, of course, when the Access program users are using the virtual drive. Depending on the requirements of your installation, you may either encourage or discourage the use of the virtual drive for DOS programs, which can be run either from the user's local disk or from the virtual drive (assuming the programs are installed on the virtual drive). For example, to discourage use of the virtual drive for DOS programs, you can limit the number of publicly accessible directories containing DOS programs. (Individual users can still copy DOS programs to their own directories on the host disk, however.)

Establishing Shared Personal Computer Software Libraries

The Access program system administrator is responsible for creating and administering libraries of DOS software used by the network-wide community of Access program users. The software libraries managed by the system administrator are analogous to personal libraries created on the host disk by individual Access program users to store their own copies of personal computer software. The difference is that the shared libraries created by the system administrator are accessible to all system users rather than to only a single user.

To create a publicly accessible library of DOS software on the host disk, follow these procedures:

1. Choose the DOS software you wish to store and execute on the host disk. The Access program utilities such as DOS2AIX, EM2, JOBS, ON, KILL, PRINTER, and AIX2DOS, for example, can be installed on the host disk. (These utilities are distributed with the Access program personal computer software.) You can also install any other internally developed, site-licensed, or public domain DOS software that can be stored on and executed from a fixed disk. Such DOS programs might be obtained off-the-shelf or created with any of the widely available utilities that run under DOS for writing, compiling, and linking DOS programs.¹
2. Log in to a host from a personal computer using the Access program.
3. Make a directory on the host disk to store the software you have selected. This directory must be easy to find and execute for all Access program users. We recommend `/usr/pci/pcbin` as the standard directory for DOS executable programs.

¹Some copy-protected DOS programs cannot be installed on the host disk. Such programs are generally not internally developed, site-licensed, or public domain, however, and therefore may be illegal to install in a publicly accessible host directory.

4. Install the DOS programs in `/usr/pci/pcbin` on the virtual drive just as you would install them in a subdirectory on a local fixed disk. During the installation procedure, refer to the virtual drive by the name the Access program returns to you when you log in (usually C: or D:).
5. Set the host permission modes for the DOS files and the directory containing them so that Access program users can access the files. The DOS files must be readable but need not have host execute permission. Directories must be readable and executable. Write permission is also often required for directories containing DOS applications, since many applications create temporary files when executed. You can use the Access program ON command with an AIX operating system `chmod` command to set the modes correctly. To make a file on virtual drive D: readable by all other users but writable only by you, type:

```
on d: chmod 644 filename
```

To make a directory on virtual drive D: readable, writable, and executable by you and all other users, type:

```
on d: chmod 777 directory
```

6. Inform the Access program users of the location of the newly installed software and be prepared to assist them in setting their DOS search paths appropriately. For example, assume an Access program user has a personal computer with one fixed disk and normally has a DOS search path set to C:\BIN. The Access program virtual drive for this user is normally drive D:. To make `/usr/pci/pcbin` easily accessible, the user's search path should be set with the command:

```
path=c:\bin;d:\usr\pci\pcbin
```

The PATH command can be added to the user's AUTOEXEC.BAT file to make it effective every time the user boots the personal computer. For further information on using the AUTOEXEC.BAT file with the Access program, refer to the *AIX Access for DOS Users User's Guide*.

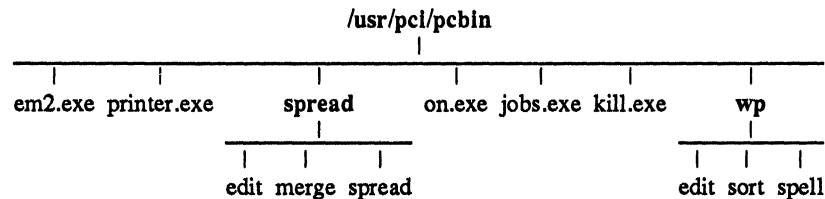
Tailoring Your Software Libraries

Sometimes it can be useful to create subdirectories within `/usr/pci/pcbin` so that related DOS files can be grouped together. Here are some factors to consider when evaluating the need for subdirectories of DOS software:

- A single directory containing all personal computer software is convenient because it is easily accessible to all the Access program users. The directory can be included in the search paths of all the Access program users, and there is little danger that users needing personal computer software will not be able to find it.

- However, a single directory containing all personal computer programs can become unmanageable if it contains a large number of personal computer programs. For example, a single personal computer application program can contain several files (sometimes including both executable and data files). If many such programs are in the same directory, it can be difficult to keep track of which files belong to which programs. Moreover, with a large number of files in the same directory, there is a risk of file-name conflicts between existing files and new ones that you want to add.
- To reduce confusion, you can create separate directories for individual personal computer programs or groups of related programs. When you add such directories, however, bear in mind that users must be informed of the existence of these directories and must add them to their search paths.

As an example, consider the following use of the `/usr/pci/pcbin` directory:



In this example, separate subdirectories are created for a spreadsheet program (`spread`) and a word-processing program (`wp`). The subdirectories allow the files for the two different applications to be grouped separately. Since both applications have files named `edit`, using two subdirectories also avoids a file name conflict. The standard Access program utilities remain immediately subordinate to `/usr/pci/pcbin`. For this example, DOS search paths for Access program users would be set to include `/usr/pci/pcbin`, `/usr/pci/pcbin/wp`, and `/usr/pci/pcbin/spread`.

Software Libraries For The Access Program Host Commands

The directory `/usr/bin` is recommended for storing utilities executable under the host system that are of interest to the Access program users. You can add any other host programs you choose to this directory. In general, the same tailoring issues apply as for libraries of DOS software. We do not recommend creating subdirectories within `/usr/bin`, however. Following are considerations for host software libraries that do not apply to DOS libraries:

- Programs that run on an AIX operating system must be executable, unlike DOS programs which must only be readable.
- Search paths for host programs are relevant only for users who log in as host users—that is, users logging in from terminals and Access program terminal emulation users. Do not set host search paths for Access program file service users.

AIX Operating System Permission Modes

The Access program supports the standard AIX operating system file permission modes. Both file service and terminal emulation users have the same privileges and restrictions regarding access to host files as other system users.

The user's **umask** determines the permission mode with which a host file is created. Users connected directly to the host system use the default host system **umask**, or they can change their own **umask** to reflect their preferred default permission modes. The Access program **umask** for all RS-232 users (both file service and terminal emulation) and for LAN terminal emulation users is determined in the same way: they either use the default **umask** or specify their own **umask**.

The Access program file service users connected to the host via LAN all have the same **umask**, which cannot be changed by individual users. The system administrator, however, can change the system-wide **umask** that affects these users.

The script `/etc/rc.pci` sets the **umask** when the Access program is initialized. This **umask** is inherited by the connection server (`/usr/pci/bin/pciconsrv`) and applies to all Access program LAN file service users. The initial **umask** is 002, which means:

- Files are readable by all system users and writable by both the owner and others in the owner's group.
- Directories are readable and executable by all system users and writable by both the owner and others in the owner's group.

The following example displays the contents of a typical host directory with files and subdirectories created using the Access program file service over LAN. The list is produced with the `ls -l` command. Read, write, and execute permissions are shown in the first column.

```
-rw-rw-r-- 1 jones   usr      3400 Mar 13 11:09 bdgtnemo
drwxrwxr-x 3 jones   usr      436 Mar  7 18:21 chapter.one
-rw-rw-r-- 1 jones   usr     2400 Mar 18 16:31 message
drwxrwxr-x 2 jones   usr       92 Mar 18 16:32 pci
-rw-rw-r-- 1 jones   usr    1465 Mar  4 10:56 prjctmem
drwxrwxr-x 3 jones   usr      228 Mar 18 18:43 report
-rw-rw-r-- 1 jones   usr    3278 Mar  7 18:53 staff
-rw-rw-r-- 1 jones   usr     2400 Mar  5 11:06 status.rep
```

To change the **umask** for the Access program users:

1. Modify the file `/etc/rc.pci` to change the line that reads:

```
umask 002
```

to reflect your desired **umask**.

2. Stop the execution of the Access program.
3. Restart the Access program.

There are no special Access program considerations associated with AIX operating system groups.

For further information on permission modes and groups, refer to the descriptions of **chmod**, **chown**, **umask**, **group**, and **setuid** in your host system documentation and the discussion of changing permission modes in the *AIX Access for DOS Users User's Guide*.

Enabling And Disabling Terminal Emulation Ports

If you are using terminal emulation over an RS-232 connection, you must first add a terminal device (tty) using the AIX **devices** command.

Access program terminal emulation can be used in these four ways:

1. Over a LAN concurrently with the Access program file services. (The user first logs into the Access program file services with the LOGIN command and then invokes EM2.)
2. Over a LAN independently of the Access program file services. (The user invokes EM2 after booting the Access program working diskette, without logging into the Access program file services.)
3. Over RS-232 concurrently with the Access program file services (as described in item 1 for the LAN case).
4. Over RS-232 independently of the Access program file services (as described in item 2 for the LAN case).

Note that in this case, the host treats the user's personal computer like a standard asynchronous terminal in all respects; the Access program host software is not involved. Administration of such personal computers therefore requires no special procedures.

For the remaining three cases, the Access program uses host files that can be modified to change the maximum number of simultaneous terminal emulation sessions allowed. In the following description, references to emulation over LANs apply to emulation both concurrently with file services and independently of file services. References to emulation over RS-232 apply only to emulation concurrent with file services.

For a more thorough description of the operation of terminal emulation, see Chapter 5, AIX Access for DOS Users System Architecture. Here we concentrate on the files you need to know about and the operations that must be performed to reconfigure the available terminal emulation ports.

Files That Control Terminal Emulation Ports

The following factors determine the number of available terminal emulation ports:

1. **Entries in the file /usr/pci/pciptys**— This file is accessed by the Access program servers to determine which pseudo-ttys (ptys) are available for use in terminal emulation. The number of entries in the file determines the number of possible simultaneous terminal emulation sessions.

The file lists the ptys used for terminal emulation in the form:

control_half: slave_half: [optional getty command]

An example of entries in a **pciptys** file appears below:

```

:
:
ptyp0:ttyp0:
ptyp1:ttyp1:
ptyp2:ttyp2:/etc/getty/dev/ ttyp2 9600
:
:

```

Note: There should be no blank lines in the **pciptys** file.

The third entry in the example above illustrates the optional **getty** command, which tells the Access program server to start a getty on that pty. For some installations, this form of pty entry is used for LAN terminal emulation. This form is never used for RS-232 terminal emulation, however. For ptys used for RS-232 terminal emulation, gettys must be started in **/etc/inittab**, as described later in this section.

2. **Special files in the directory /dev** — The **/dev** directory contains pairs of special files with names corresponding to the entries in the **pciptys** file. There are separate files for the control half and the slave half of each pty. For example, the following files corresponding to the **/usr/pci/pciptys** entries shown above appear in **/dev**:

```

ptyp0:ttyp0:/etc/getty /dev/ttyp0 9600
ptyp1:ttyp1:/etc/getty /dev/ttyp1 9600
ptyp2:ttyp2:/etc/getty /dev/ttyp2 9600
ptyp3:ttyp3:/etc/getty /dev/ttyp3 9600
ptyp4:ttyp5:/etc/getty /dev/ttyp4 9600
ptyp5:ttyp6:/etc/getty /dev/ttyp5 9600
ptyp6:ttyp6:/etc/getty /dev/ttyp6 9600
ptyp7:ttyp7:/etc/getty /dev/ttyp7 9600

```

The number of pty devices in **/dev** available for the Access program terminal emulation may differ from system to system.¹

Most systems have enough pty devices to accommodate as many terminal emulation ports as the host system can adequately support. That is, simultaneously using more emulation ports than can be accommodated by the existing **/dev** special files would degrade system performance to an unacceptable level. Therefore, you should generally not need to create special files in **/dev**. If you find it necessary to increase the number of available **/dev** devices, refer to the reference manuals supplied with your AIX operating system, particularly the **mknod(8)** manual page.

¹On some hosts, pty devices are used for other purposes in addition to the Access program terminal emulation. The **telnet** program and some windowing software, for example, use ptys. If a given pty is in use when the Access program tries to open it, the Access program tries to open each successive pty listed in **/usr/pci/pciptys** until it succeeds in opening one. For further information, see Chapter 5.

3. **Entries in the file /etc/inittab**—For every entry in **pcipty**s that does not include a **getty** command, there must be an entry in **/etc/inittab** to start a **getty** on that pty. An example of the **/etc/inittab** entries is:

```
                :  
                :  
ttyp0:  
    id = ttyp0  
    level = 14  
    action = respawn  
    command = "/etc/getty /dev/ttyp0"  
                :  
                :
```

If the third field of the entry is "respawn," as in the example for **ttyp0** above, a **getty** is started on that device, and the corresponding port is available for terminal emulation. If it is "off," a **getty** is not started. (For further information on **/etc/inittab**, refer to your AIX manual pages on **inittab** and **getty**.)

Procedure For Enabling And Disabling Ports

To change the number of terminal emulation ports available, follow these procedures:

1. To increase the number of terminal emulation ports available, edit the file **/usr/pci/pcipty**s and add entries for the new ports to be enabled. Format your entries like the existing entries, but increment the number by one for each new entry. For example, if your system has eight ports (numbered 0-7) available when the system is installed and you want to enable two more ports, add the following lines to **/usr/pci/pcipty**s:

```
ptyp8:ttyp8:/etc/getty /dev/ttyp8 9600  
ptyp9:ttyp9:/etc/getty /dev/ttyp9 9600
```

If the *Release Notes* accompanying this manual specify that ptys used for LAN terminal emulation should have **getty**s started in **pcipty**s, also include the **getty** command as the third field. The **getty** command instructs the Access program connection server (**pciconsvr**) to start a **getty** on that pty when it is needed. When the Access program is *not* using that pty, the **getty** is not running on it; therefore, it is available to other programs, such as **telnet**.

The **getty** command has the syntax:

```
/etc/getty devname 9600 [arguments]
```

where *devname* is the pty device name (such as **/dev/ttyp0**). Arguments should mimic the entries in **/etc/inittab**. Do not include the comments, which are anything prefaced with a pound sign (#).

If the new port is to be used for RS-232 terminal emulation, the third field must not be present. Instead, the `getty` must be started in `/etc/inittab`. Prys set up for RS-232 terminal emulation are not available for use by other programs.

2. To reduce the number of terminal emulation ports available, edit the file `/usr/pci/pcipty`s and delete a line for each port you wish to disable. For example, to remove the two ports added according to the previous example, delete the lines:

```
ptyp8:ttyp8:/etc/getty /dev/ttyp8 9600
ptyp9:ttyp9:/etc/getty /dev/ttyp9 9600
```

Remember that for RS-232 service, there must be at least one entry with no `getty` command specified and a line in `/etc/inittab` to start a `getty` on that pty.

3. To increase the number of ports one at a time, use the `devices` command to add a pty to your system. Set the value for `automatic enable` to `TRUE`. Set the terminal type to `VT220` and the parity type to `none`. To enable a device without restarting the system, use the `penable` command.

DOS Software Compatibility Issues

Most DOS software is compatible with the Access program operation. This means that DOS applications running on personal computers can access files on the host through the Access program. DOS applications can also be stored on and executed from the host disk, as described under "Establishing Shared Personal Computer Software Libraries."

Following is a summary of the constraints on DOS software when used with the Access program. In general, applications will operate with the Access program if they *do not*:

- Overlay the DOS or BIOS area of storage.
- Program the 8259 interrupt controller in a way that interferes with the Access program's use.
- Disable interrupts, fail to issue an end-of-interrupt or `IRET` on a hardware interrupt level, or mask selected interrupt levels for more than 100 milliseconds.
- Use interrupts 13, 25, or 26 for access to the virtual drive.
- Configure hardware device registers that belong to the network hardware used by the Access program.
- Make incorrect use of timer interrupts.

aix access for dos users administration

- Open more than 125 files. This number is not affected by the value of the FILES= parameter in the CONFIG.SYS file.
- Make use of memory not assigned to them by the operating system.
- Require more than 127 DOS file descriptors (that is, require the FILES= parameter in CONFIG.SYS to have a value greater than 127).

This list may not be complete.

Limitations

You should be aware of the following limitations when using the Access program:

- Functionality of the DOS BACKUP command may be reduced on the virtual drive. The Access program does not toggle the archive bit, so you cannot use BACKUP for incremental backups. We recommend you use the backup utilities provided by your AIX operating system.
- Do not use the following PC-DOS commands with the virtual drive: ASSIGN, BACKUP, RESTORE, RECOVER, LABEL, CHKDSK, JOIN, TREE, and SHARE.
- Do not use any version of DOS prior to 3.10.
- Do not use any version of IBM PC-DOS print spooling.

Chapter 5. Access System Architecture

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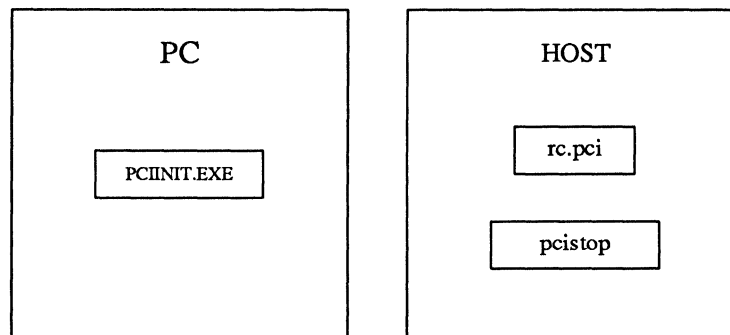
Introduction

This chapter provides an architectural overview of the AIX Access for DOS Users system. It describes how the Access program software modules interact during file service and terminal emulation sessions. Refer to the *AIX Access for DOS Users Host Installation Guide* Files and Host System Modification table for an overview.

Software Structure For The Access Program Over A LAN

Starting And Stopping The Access Program Software On Personal Computers And Hosts

The term "LAN" refers to a connection between a host and a personal computer over a network adapter such as Ethernet.



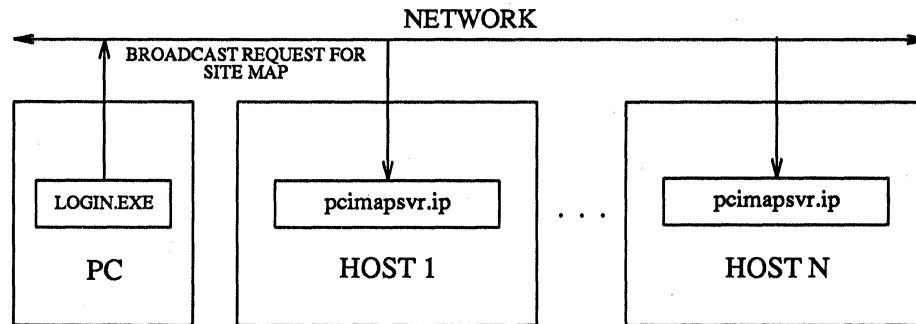
Before any interaction between personal computers and hosts can take place using the Access program, the Access program software must be installed and initialized on both the personal computer and the host. The PCIINIT.EXE program on the personal computer initializes the personal computer side of the Access program. PCIINIT is normally invoked from the user's AUTOEXEC.BAT file, so it is executed automatically when the personal computer is booted.

Modules that support the Access program service on the personal computer are loaded as device drivers at boot time. These modules are specified in CONFIG.SYS. When a LAN is used, these modules are BRIDGE.DRV and *driver.DRV* (*driver* represents your network interface board). BRIDGE.DRV is the basic Access program support module. *driver.DRV* is the LAN driver. All communication originating from the personal computer side of the Access program and destined for the network passes through the LAN driver.

The module `/etc/rc.pci` initializes the Access program on the host. Its purpose is to start the two Access program daemons that run on the host—`/usr/pci/bin/pcimapsvr.ip` and `/usr/pci/bin/pciconsvr.ip`. The `rc.pci` module also establishes the host environment in which the Access program runs.

The module `/usr/pci/bin/pcistop` stops the two daemons and terminates the execution of the Access program LAN processes on the host. (Note that no equivalent module is required on the personal computer, since operation on the personal computer side is normally terminated by turning off the personal computer or booting without the Access program.)

Establishing An Access Program Connection Between A Personal Computer And A Host

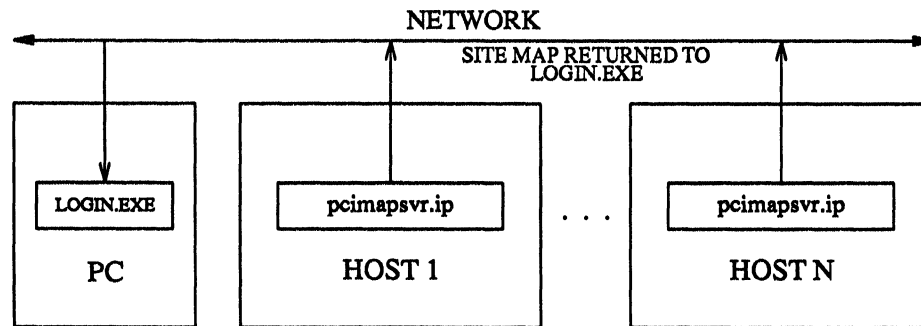


To begin an Access program file services session, the personal computer user executes the LOGIN command. LOGIN.EXE (LOGIN) broadcasts over the network a request for a site map. A site map is a table listing the hosts on the network that are up and running the Access program—that is, all the hosts to which the personal computer can possibly connect.

The daemon `/usr/pci/bin/pcimapsvr.ip` (`pcimapsvr`) on each host has two related functions:

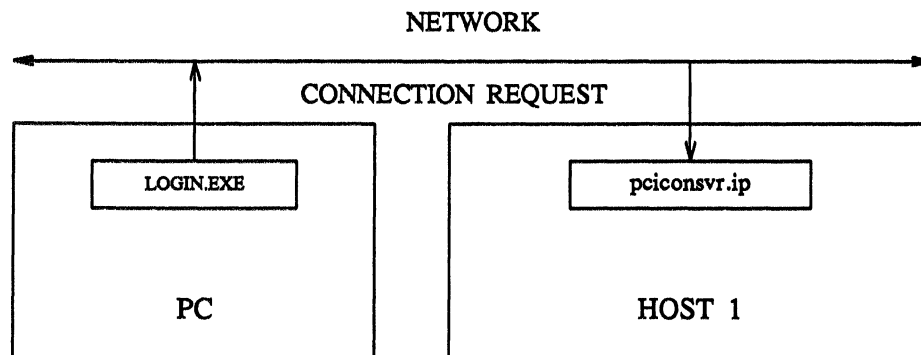
1. To listen for broadcast "`pciconsvr hostname here`" messages from each host running the Access program. (The module that broadcasts these messages is `/usr/pci/bin/pciconsvr.ip`.) Each `pcimapsvr` keeps a table of available hosts that is updated approximately every 30 seconds based on these broadcasts.
2. To listen for broadcast requests for site maps issued by LOGIN and to send the current site map to any LOGIN process that requests it.

In response to LOGIN's request for a site map, therefore, each `pcimapsvr` returns its current site map, as illustrated in the following diagram:



On the personal computer side, LOGIN listens for the first returned site map and ignores any other incoming site maps from other hosts.

LOGIN displays for the personal computer user the list of available hosts. The user selects a host from the list, and LOGIN formats and sends a connection request to `/usr/pci/bin/pciconsvr.ip` (**pciconsvr**) on the selected host, as illustrated in the following diagram:



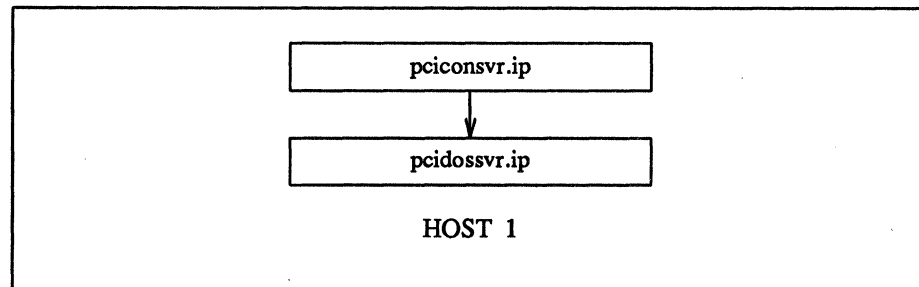
Note that the connection request need not be directed to the same host that provided the site map to LOGIN. Since all **pcimapsvrs**, under normal circumstances, have a current list of all available hosts, LOGIN can use the site map provided by any **pcimapsvr**.

Like the **pcimapsvr**, each **pciconsvr** has more than one job:

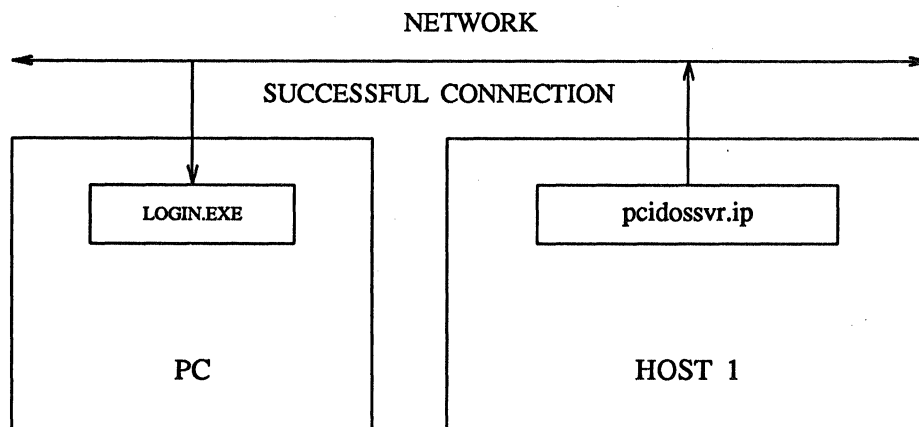
1. To broadcast "**pciconsvr hostname here**" messages approximately every 30 seconds. These messages are used by **pcimapsvrs** to keep their lists of available hosts up-to-date.
2. To manage the connection between the personal computer and the host. This task includes several subordinate tasks. The connection management process begins when a **pciconsvr** receives a connection request, as illustrated above.

access system architecture

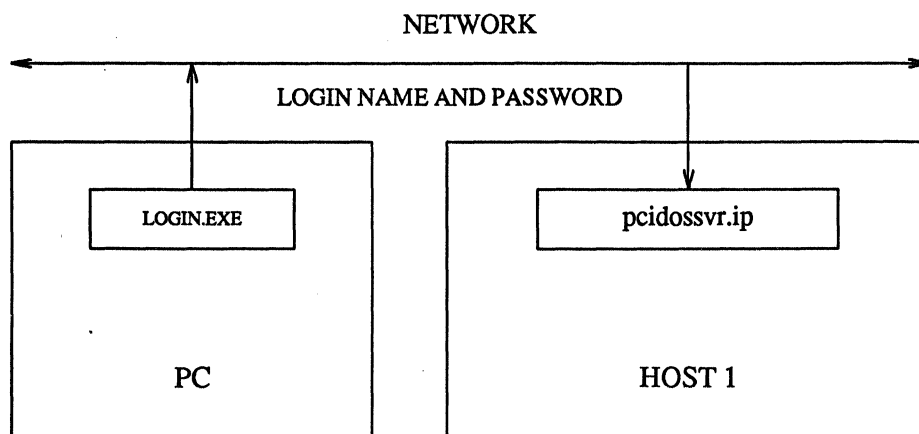
When the **pciconsvr** receives a connection request from LOGIN, it assigns a port number for use in subsequent communication with the personal computer and spawns a new process, **/usr/pci/versions/3.2/pcidossvr.ip** (**pcidossvr**):



The **pcidossvr** inherits the port from the **pciconsvr** and informs LOGIN that a connection was successfully established, as illustrated in this diagram:



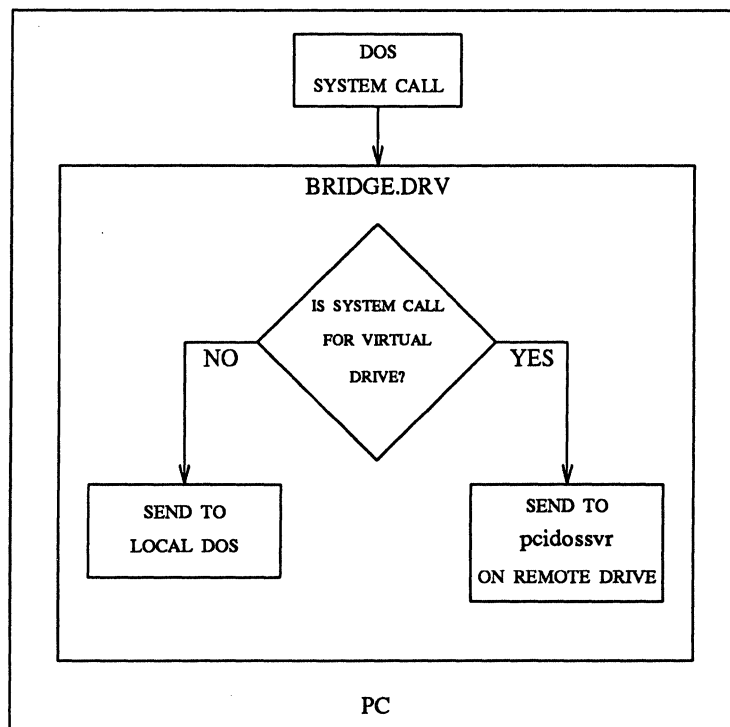
LOGIN then prompts the user for user name and password and transmits them to the **pcidossvr**, as the following diagram illustrates:



The **pcidossvr** validates the user name and password, changes its own user and group IDs to those of the logged in user, and informs **LOGIN** that the process has successfully completed. **LOGIN** tells the user on what drive the host file system is available, welcomes the user to the Access program, and returns the DOS prompt to the user.

Using An Established Access Program Connection

At this stage, bidirectional communication can occur between the personal computer and the host. On the personal computer side, the **BRIDGE.DRV** module takes over the task of communicating with the remote host. A top-level view of the operation of **BRIDGE.DRV** is as follows:



As shown in the illustration above, **BRIDGE.DRV** is interposed between the user's invocations and the local DOS that the user booted on the personal computer. The **BRIDGE.DRV** module intercepts all DOS system calls (the principal one being **INT 21H**). If the system call is a request for a local device, **BRIDGE.DRV** passes it unmodified to the local DOS. If the request is for the remote (virtual) drive, **BRIDGE.DRV** formats a transaction and sends it to its **dossvr** on the host to be processed.

The `pcidossvr` module on the remote host translates the user's standard DOS system calls into appropriate AIX operating system commands, executes them on behalf of the user, translates the results back into standard DOS, and returns the results to the user via `BRIDGE.DRV`.

Access Program Utilities

When an Access program file service session has been established as described above, the following special Access program utilities become useful:

- ON
- JOBS
- KILL
- PRINTER
- UDIR

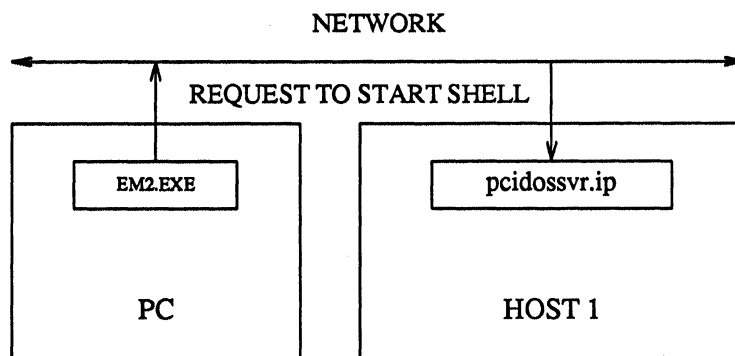
These commands allow the user to manipulate and display data on the remote drive in ways not allowed by standard DOS. For descriptions of their operation, see the *AIX Access for DOS Users User's Guide*. The following Access program commands can be used independently of file services, as well as during a file service session:

- `/usr/pci/bin/charconv` (executable under an AIX operating system) and `CHARCONV.EXE` (executable under DOS)
- `/usr/pci/bin/dos2aix` (executable under an AIX operating system) and `DOS2AIX.EXE` (executable under DOS)
- `usr/pci/bin/aix2dos` (executable under an AIX operating system) and `AIX2DOS.EXE` (executable under DOS)
- `EM2.EXE`

For a description of both the DOS and host-executable versions of `DOS2AIX` and `AIX2DOS`, refer to the *AIX Access for DOS Users User's Guide*. `EM2.EXE` is described from the user's point of view in the *AIX Access for DOS Users User's Guide* as well, but additional relevant information appears below.

Using Terminal Emulation

To use the Access program to communicate with the remote host system through a standard AIX operating system shell rather than through DOS commands via host file services, you use the terminal emulation program EM2.EXE (EM2). When you invoke this program, it broadcasts a request for a site map, just as LOGIN does. EM2 displays the returned site map, and you choose the host on which your terminal emulation session is to be established. EM2 then requests the `pcidossvr` on the remote host to start a shell on your AIX operating system as the following diagram illustrates:

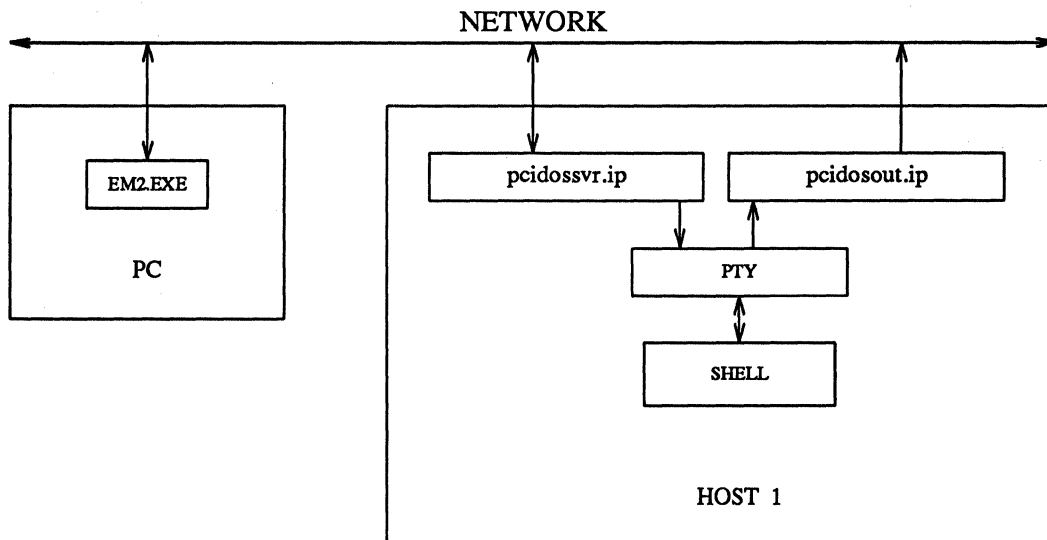


The AIX operating system shell is presented to your personal computer through a pseudo-tty (pty) on the host side.

The events that occur when the `pcidossvr` receives the request from EM2 to start a shell are as follows:

- The `pcidossvr` opens the control side of the pty. To do this, the `pcidossvr` attempts to open each pty listed in the file `/usr/pci/pciptys` until it succeeds in opening one.
- Once the control side of the pty is opened, `getty` starts a login operation on the slave side of the same pty.
- The `pcidossvr` spawns another process, `/usr/pci/versions/3.2/pcidosout.ip` (`pcidosout`), which sends characters from the host shell (via the pty) back to the user.

The following diagram depicts the end result of this process:



The **pcidosout** process is required because the **pcidossvr** cannot listen for Access program file service messages from the network at the same time as it listens for characters sent from the pty. The **pcidosout** process is therefore assigned the task of reading characters from the pty and sending them back to the user.

When you invoke EM2 during an Access program file services session, the terminal emulation process does not terminate file services. You can alternate freely between standard Access program file services and terminal emulation. Data sent by EM2 to the remote host is marked as terminal emulation data and is processed as described above. To suspend terminal emulation (without terminating the emulation session), press ALT-D. This allows you to return to DOS and continue using file services. To return to an ongoing terminal emulation session, reinvoke EM2. To terminate the emulation session, press ALT-L. A request to terminate emulation goes to the **pcidossvr**, which kills the **pcidosout** process. The **pcidossvr** closes the control side of the pty. The pty driver sends a SIGHUP signal to the host processes associated with that pty. The host shell closes the slave side of the pty and exits. You can then use ALT-D to return to DOS and continue using the Access program file services.

Using The Terminal Emulator Without Establishing A File Services Session

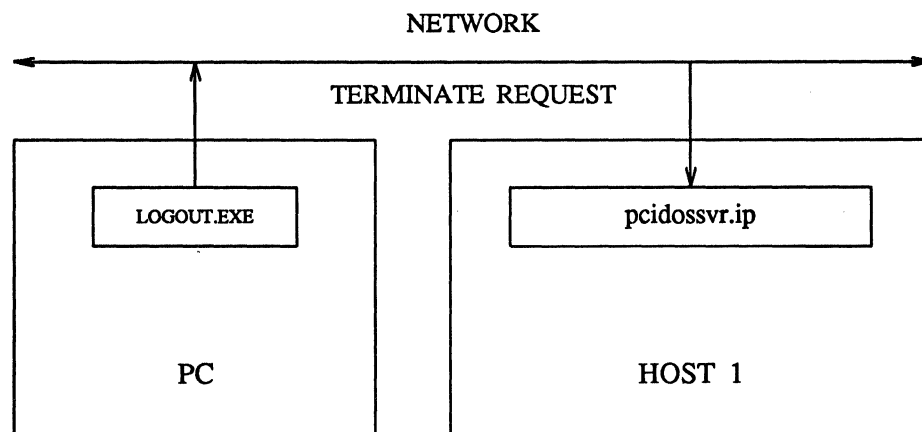
You can use the terminal emulator without establishing a file services session—that is, without logging in to the Access program. The Access program must be initialized (using **PCIINIT.EXE**) for emulation to work, however.

When you invoke EM2 independently of a file services session, it broadcasts a request for a site map, just as it does when invoked during a file services session. When you choose a host for terminal emulation, EM2 requests that **pciconsvr** invoke a **pcidossvr** since, without a file services session, there is no **pcidossvr** already executing on behalf of the personal computer user on the remote host. You can then log in to the host and use terminal emulation as described above.

The only difference when you invoke the emulator outside of a file services session is that you cannot alternate between terminal emulation and file services. DOS is still available locally, and you can alternate between terminal emulation and local DOS by pressing ALT-D and invoking EM2 as described above.

Ending An Access Program File Services Session

When you execute the Access program LOGOUT.EXE command from your personal computer, a terminate request is sent to the **pcidossvr**, as illustrated in the following diagram:



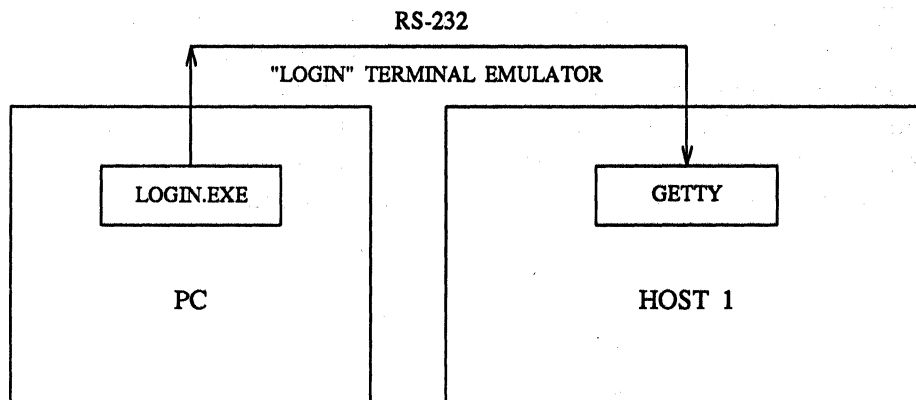
The **pcidossvr** sends a terminate request signal to any **pcidosout** process that might still exist (thus terminating any EM2 session to that host) and then exits. When the **pcidosout** and **pcidossvr** processes exit, the **pciconsvr** frees the network port and cleans up its status tables.

Software Structure For The Access Program Over RS-232

To use the Access program over RS-232, the Access program software on both the personal computer side and the host side must be installed and initialized just as in the LAN case. BRIDGE.DRV is loaded on the personal computer side, as in the LAN case. No network device driver is required, however.

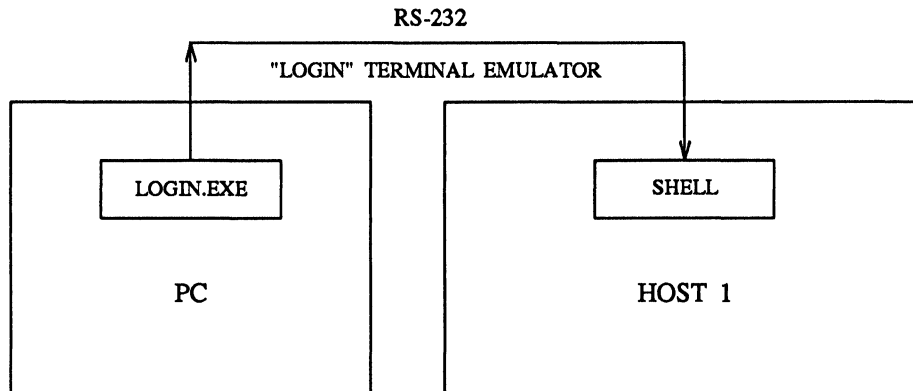
When you invoke the LOGIN command, a site map is requested and returned, again as in the LAN case. The list of available hosts displayed shows RS-232 serial ports as **com** ports. There may be one or more serial ports. (If no LAN is available, only the serial ports are shown.)

No **pciconsvr** is used with RS-232. Instead, when you select the RS-232 line, LOGIN invokes a special-purpose terminal emulator specifically for the purpose of logging in to the remote host, as illustrated in the following diagram:

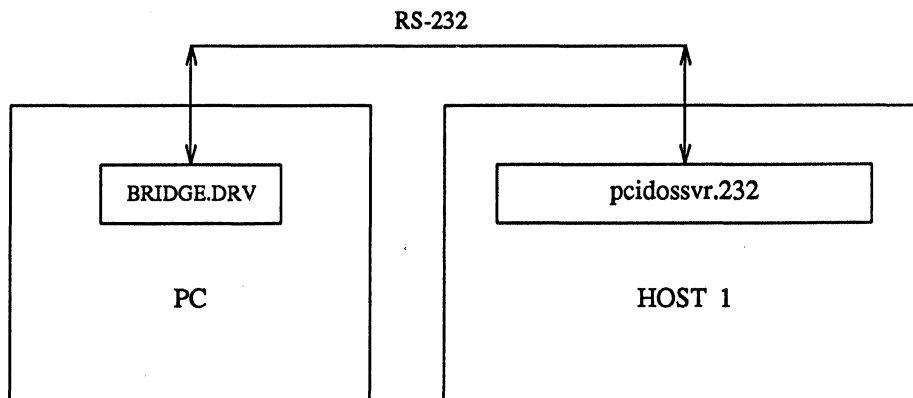


The RS-232 cable is connected to the host just like any RS-232 cable coming from a standard terminal. Using the special-purpose emulator, you log in to the host as though from a terminal. You now have a normal AIX operating system shell running, as illustrated below:

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When the login is finished, press F9. This terminates the special-purpose emulator and invokes `/usr/pci/pcidossvr.232` on the host. As in the LAN case, LOGIN then informs you on which drive the host file system is available, welcomes you to the Access program, and returns the DOS prompt. (Unlike the LAN case, the `pcidossvr` for RS-232 does not have to validate your user name and password or change the user and group IDs. Because you have logged directly in to the host system as a standard user, the login process does the validation, and the `pcidossvr` automatically inherits your user ID and group ID.) At this stage, you can communicate with the remote host and use the Access program utilities just as in the LAN case, as shown in the following diagram:



The software structure and operation for terminal emulation over RS-232 is the same as for terminal emulation over a LAN with one exception: the process spawned by the `pcidossvr` for output to DOS is `/usr/pci/versions/3.2/pcidosout.232`, not `/usr/pci/versions/3.2/pcidosout.ip`.

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Chapter 6. Problem-Solving Tools

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problem-solving tools

Introduction

As system administrator, you may be called upon to assist users with problems they encounter using AIX Access for DOS Users. The problem determination procedures in this chapter can help you determine if a problem is hardware related, software related, or caused by user errors.

For hardware problems, refer to the *Technical Reference* or *Guide to Operations* for the user's personal computer. For user error and software problems that are not described in this chapter, refer to the DOS reference manual or user's guide. This chapter concentrates on errors that are attributable to the Access program.

The approach to problem determination taken by this chapter is to break down the problem into its components and address the individual problems in order.

During this process you need to carefully collect the clues provided by the system (such as error messages and directory contents) to determine the exact nature of the problem.

Before using the procedures in this chapter, try to reproduce the problem you are having on a different personal computer. Make sure that you use the same software and hardware environment in running your duplication test.

If you cannot reproduce the problem, it may have been caused by a loose connection between the personal computer and the network or by hardware problems internal to the personal computer. If ensuring that the network is connected properly does not correct the problem, your personal computer may need repair. If the problem persists on another personal computer, continue with this procedure to classify your problem.

Most Access program problems occur in one of five major areas: system startup, establishing communication, proper usage, record locking, and normal operation. You can determine in which area to begin problem determination by following this procedure:

1. Does the failure occur during loading or Access program initialization, before you attempt to log in?

Yes: Start with "Problems With System Startup."

No: Continue with the next step.

2. Does the failure prevent a session from being established?

Yes: Start with "Problems Establishing Communication."

No: Continue with the next step.

problem-solving tools

3. Does the failure occur during an Access program session?

Yes: Start with "Problems With Usage." If your problem is not described there, continue with "Problems With Record Locking," "Problems With Normal Operation," or "Problems With NLS Capabilities."

No: The problem is not the Access program related. Refer to your *Guide to Operations* or specific application manual.

Refer to the proper heading in this section, as determined above, to find the cause of and solution for your problem. If you try the corrective actions described and the same problem persists, report the problem to your Access program vendor.

Problems With System Startup

This section helps you determine the cause of a problem that occurs during system initialization, before you attempt to log in.

The Access program system must be installed on a working diskette (that is, a diskette that contains the DOS system files) or fixed disk. The installation procedure given in the *AIX Access for DOS Users User's Guide* combines the required Access program files on a diskette (or fixed disk) with the DOS operating system, creating a working diskette.

Attempt to boot the personal computer from the fixed disk or working diskette containing the Access program by turning on the personal computer or by holding down the CTRL and ALT keys while you press the DEL key. When first powered on or booted, the personal computer runs a Power-On Self Test (POST). On some personal computers, a successful POST prints no messages; on others, it prints a series of messages of the form "xx KB," indicating the amount of memory that has been tested. Compare the POST when booting with your Access program working diskette to a POST when booting from your DOS system disk without the Access program. Use the following procedure to determine if your problem can be attributed to a system startup error:

1. Did the POST complete correctly without producing any error messages when the personal computer was powered on or booted?

Yes: Continue with the next step.

No: Refer to the *Guide to Operations*.

2. Was a "Non-System disk or disk error" message displayed?

Yes: The disk does not have the correct operating system files on it for DOS to load. Refer to your *Guide to Operations* and the *AIX Access for DOS Users User's Guide* for the procedures for creating an Access program working disk.

No: Continue with the next step.

3. Were the banners "AIX Access for DOS Users Release 2.1" and "*driver*, Release 2.1" (where *driver* is the name of the network driver) displayed? (**Note:** If the Access program is installed for RS-232 only, the second banner is not displayed.)

Yes: Continue with the next step.

No: The file CONFIG.SYS must be present in the root of the Access program disk and must contain the following lines:

```
device = bridge.drv  
device = driver.drv
```

driver.DRV represents the Access program device driver. (**Note:** This line may not be there if the Access program is being used over RS-232 only.) There may be directories specified for the devices (for example, you may see DEVICE = \PCNBRIDGE.DRV).

Repeat the Access program installation process if necessary to correct this problem.

4. Was a "Bad or missing BRIDGE.DRV" or "Bad or missing *driver*.DRV" message displayed?

Yes: The file BRIDGE.DRV or *driver*.DRV was not found where specified in the CONFIG.SYS file. Ensure that the files are present in the locations specified in CONFIG.SYS. Repeat the Access program installation process if necessary to correct this problem.

No: Continue with the next step.

5. Was the message "Bad command or file name" displayed?

Yes: The program PCIINIT.EXE may not have been found. It must be in a place where it can be executed at startup from the file AUTOEXEC.BAT. It must either be in the root of the Access program disk, or in a subdirectory specified in the search path. Repeat the installation process to place the file in the correct location.

No: Continue with the next step.

6. Was the message "pciinit: cannot find correct BRIDGE device" displayed?

Yes: The PCIINIT program cannot find the Access program bridge. To correct this problem, reinstall the Access program on the personal computer.

No: Continue with the next step.

problem-solving tools

7. Was the message "pciinit: cannot open *path*\hosts" displayed?

Yes: PCIINIT cannot find the HOSTS file. Either the file is not there, or there is no pointer to it in your AUTOEXEC.BAT file. If you have no HOSTS file, create one. The file should contain your personal computer's address, its name, and the word *localhost*. You also need to add the following line to your AUTOEXEC.BAT file:

```
HOSTS=path
```

where *path* is the path of your HOSTS file. Usually the line should look like this:

```
set hosts=\etc
```

No: Continue with the next step.

8. Was the message "AIX Access for DOS Users Release 2.1 (*serial*) Initialized" displayed?

Yes: The resident part of the Access program initialization has succeeded. Continue with the section on establishing communication.

No: If you have verified the contents of AUTOEXEC.BAT, then PCIINIT should have been executed. If an error message was displayed (other than the ones described above), report the problem to your Access program vendor.

Problems Establishing Communication

This section helps you determine the cause of a problem that occurs during attempts to establish communication with your host. Depending on the type of service that you want to use, one of two programs is run to establish communication. If you want to initiate host file services, you run the LOGIN program. If you want to use your personal computer to emulate a VT220 terminal, you run the EM2 program.

Refer to Appendix B of the *AIX Access for DOS Users User's Guide* for errors that are not covered here.

Problems With LOGIN

1. After you executed the LOGIN command, was the message "Bad command or file name" displayed?

Yes: The LOGIN.EXE file is not in the current directory nor in a directory that is listed in your DOS search path. The path is normally set during system startup by AUTOEXEC.BAT. To set the path yourself, see the DOS user's guide. If LOGIN.EXE is not on your disk, repeat the Access program installation process.

No: Continue with the next step.

2. Did you get a host selection menu?

Yes: Continue with the next step.

No: Go to step 4.

3. Did the host selection menu display only serial ports (com1 or com2)?

Yes: If you are using RS-232 only (no LAN), go to the next step. If you are using a LAN, check the following:

- a. Check that all network hardware is installed and connected properly. This includes checking that your network interface board is jumpered correctly.
- b. Check that you specified the correct hardware when you ran the INSTALL program to install the Access program.
- c. Check that there is an Access program host up and running on the network.
- d. If your network is IP-based, make sure the host and PC are on the same logical network.
- e. Check the arguments to the device driver in the CONFIG.SYS file (I/O address, interrupt levels, etc.).

If all of the above appear OK, contact your Access program vendor.

No: Continue with step 5.

4. Was the message "AIX Access for DOS Users Not Initialized" displayed?

Yes: You have a problem with system startup. Refer to "Problems With System Startup" earlier in this chapter to determine the exact nature of the problem.

No: Continue with the next step.

5. After you selected a host, was the message "Selected Host Not Available," "Selected Host Not Available—Try Again?" or "login: connection failed" displayed?

problem-solving tools

Yes: You selected a host that became unavailable after it was included in the host selection menu, your selected host cannot accommodate any more users, or there was a network communication problem.

Verify that the network is working and that your personal computer is properly connected. Try to select the same host again. If it fails again, try a different host if one is available. If that works, check that the desired host is up and running the Access program and that the hardware between the personal computer and the host is operational.

No: Continue with the next step.

6. Was the message "Login incorrect. Try Again? (y or n):" displayed?

Yes: There are two possible problems in this case:

- a. You entered an incorrect user name or password at the prompt. Check that you are using the proper user name and have the correct password. Enter y to try again.
- b. The shared memory segments needed for file sharing and record locking on the host have not been initialized. See "Problems With Record Locking" in this chapter for instructions on how to initialize the files.

No: Check Appendix B of the *AIX Access for DOS Users User's Guide* for any further LOGIN errors.

Problems With EM2

1. After you executed the EM2 command, was the message "Bad command or file name" displayed?

Yes: The EM2.EXE file is not in the current directory nor in a directory that is listed in your DOS search path. The path is normally set during system startup by AUTOEXEC.BAT. To set the path yourself, see the DOS user's guide. If EM2.EXE is not on your disk, reinstall the Access program on the personal computer.

No: Continue with the next step.

2. Did the personal computer hang after you executed EM2?

Yes: Check the current directory on the drive from which you invoked EM2 for an obsolete EM.SES file left from a previous, aborted session. If such a file exists, delete it and try executing EM2 again.

There may be a host connection problem. Check your personal computer's connectors to ensure that you are connected to the network. Verify that the network is operational, and restart your system to try again.

You may not have enough memory left to execute the emulator. Remove from your AUTOEXEC.BAT file the invocation of memory-resident programs. Restart your system and try EM2 again with no other memory-resident programs installed.

If none of the above suggestions work, report the problem to your Access program vendor.

No: Continue with the next step.

3. Did the host selection menu display only serial ports (com1 or com2)?

Yes: If you are using RS-232 only (no LAN), go to step 5. If you are using a LAN, continue with the next step.

No: Go to step 5.

4. Was the message "AIX Access for DOS Users software not initialized" displayed?

Yes: You have a problem with system startup. Go to that section to determine the exact nature of the problem.

No: You do not have a LAN connection to any hosts. Perform the following:

- a. Check that all network hardware is installed and connected properly. This includes checking that your network interface board is jumpered correctly.
- b. Check that you specified the correct hardware when you ran the INSTALL program to install the Access program.
- c. Make sure there is an Access program host up and running on the network.
- d. If your network is IP-based, make sure the host and PC are on the same logical network. Make sure that the IP addresses of the PC and the host machine do not conflict with other machines on the network.

If all of the above appear OK, contact your Access program vendor.

5. After you selected a host from the menu and pressed return, did you get a blank screen but no login prompt?

Yes: Terminate the terminal emulation session by pressing ALT-L, and try selecting the host again. If this doesn't work, check /usr/pci/pcipty.

problem-solving tools

If you are running the Access program over RS-232, check the system console. Is a message similar to the one below displayed?

```
INIT:Command is respawning too rapidly. Check
      for possible errors.
id:01"/etc/getty tty01 9600"
```

If so, your terminal driver has a getty respawn problem, and you should follow steps a and b, below.

If you have a problem with gettys respawning, do the following:

- a. Check the file `/etc/inittab` to determine the speed parameter to `/etc/getty`. In the example below, the speed parameter is 9600.

```
      :
      :
tty0:
      id = tty0
      level = 14
      action = respawn
      command = "etc/getty /dev/tty0"
      :
      :
```

- b. Edit `/etc/ports` and find the entry whose label corresponds to the speed parameter. Edit that entry, putting the word **CLOCAL** at the end of the initial-flags field. For example, this entry:

```
/dev/tty0:
  speed = 9600
  logmodes = cs7+parenb+ixon-ixoff+echoe-cstopb+hupcl
  runmodes = cs7+parenb+hupcl+cread+brkint+istrip+icrnl+ixon-ixoff-xscan
+isig+icanon+echoe+echok+opost+onlcr+tab3-cstopb
```

becomes this (the change is bold):

```
/dev/tty0:
  speed = 9600
  logmodes = cs7+parenb+ixon-ixoff+echoe-cstopb+hupcl+clocal
  runmodes = cs7+parenb+hupcl+cread+brkint+istrip+icrnl+ixon-ixoff-xscan
+isig+icanon+echo+echoe+echok+opost+onlcr+tab3+clocal-cstopb
```

No: Continue with the next step.

6. Did the message "*hostname* Not Available -- Try another? (y or n)" appear below the connection attempt message on the host selection screen?

Yes: You may have selected a host that became unavailable after it was included in the host selection menu, your selected host may be unable to accommodate any more users, or there may be a network communication problem.

Verify that the network is working and that your personal computer is properly connected. Try to select the same host again. If it fails again, try a different host if one is available. If that works, check that the desired host is up and running the Access program and that the hardware between the personal computer and the host is operational. Check that the **pciptys** file is correct, as described in "Tailoring Your Access Program System" in Chapter 4. If it is correct, contact your Access program vendor.

No: Check Appendix B of the *AIX Access for DOS Users User's Guide* for any further EM2 errors. If you cannot find an explanation for the problem you are experiencing, report the problem to your Access program vendor.

Problems With Usage

This section describes some specific Access program interactions that may result in problems if the Access program is not used correctly. Use the following procedure to determine if your problem is attributable to improper usage of the Access program:

1. Was a message indicating that you are out of room on your disk displayed?

Yes: There are several possible reasons for this message. You may actually be out of disk space. Use the AIX operating system **df** command to determine if this is the case. If so, you must remove some files from your disk.

You may be trying to create or remove a file in a directory for which you do not have write permission. Note that you may be doing this indirectly if you are using an application that needs to create temporary files as part of its operation. Check the permissions of the directory you are working in. If necessary, change directories, or change the permissions of the current directory. See "AIX Operating System File Permissions" in Chapter 2 of the *AIX Access for DOS Users User's Guide*.

No: Continue with the next step.

2. Did you try unsuccessfully to print a file on the virtual drive? (Make sure that the printer is operational and not jammed.)

problem-solving tools

- a. If you entered PRINTER and then used one of the following:

- The print-screen key.
- A COPY command to send your file to the print device (LPT1).

did your file fail to print?

Yes: Check that the host print spooler is enabled.

Try the other printing methods. If your file still doesn't print, report the problem to your Access program vendor.

No: Continue with the next step.

- b. Are you printing from within an application program and expecting to see the printout before you leave the program?

Yes: Your jobs do not print until you exit the application program unless you set a printer timeout, using the /T option to the PRINTER command. See the description of the PRINTER command in Chapter 6 of the *AIX Access for DOS Users User's Guide* for further information.

No: Continue with the next step.

- c. When you use the PRINT program, are your listings being printed with other listings embedded in them, or are they being broken into multiple parts?

Yes: The PRINT program should not be used for remote printing. See the *AIX Access for DOS Users User's Guide*.

No: If your printing problem is not described here, consult your Access program vendor.

3. When using file services, do you see strange file names with apostrophes (') or other special characters embedded in them?

Yes: These file names are a result of the Access program's "mapping" of host file names that cannot be translated directly to DOS file names. See "Naming Files" in Chapter 2 of the *AIX Access for DOS Users User's Guide* for details of file-name mapping.

No: Continue with the next step.

4. Are there files whose names are visible when you use the terminal emulator but invisible when you use host file services, even if you run the UDIR program?

Yes: When logged in to the host system you may use directory commands that allow you to see hidden files (files that begin with a dot). To see these files while using host

file services, use UDIR with the -h option. If you wish, you can rename hidden files (using the Access program ON command with the AIX operating system **mv** command) to names that are visible to the DOS operating system. See your DOS user's guide for a description of legal DOS names.

No: Continue with the next step.

5. Do you see a file in a directory listing, but you cannot access it?

Yes: The file may belong to another user, and you may not have permission to read or write it. Or, you may not have execute permission for the directory that contains the file.

Change the file permissions or move the file into a directory for which you have write permission. Refer to "AIX Operating System File Permissions" in Chapter 2 of the *AIX Access for DOS Users User's Guide* for more information.

No: Continue with the next step.

6. Did you just edit a file, but when you printed it or edited it again, it contained changes you did not make?

Yes: The application used to edit the file did not support file sharing, and the Access program has no other mechanism to prevent two users from concurrently writing to a file for which they both have write permission. In addition, the Access program cannot prevent one user from overwriting a file that has just been updated by another user.

The usual result of concurrent updating is that the changes made by the last user writing and closing the file are preserved and those made earlier are lost. Multiple users must coordinate their efforts and serialize the updates they make.

If you have files in your own directories that should not be available to other users, change the file permissions accordingly.

No: Continue with the next step.

7. Do you see a file on the virtual drive whose permissions appear to change?

Yes: There are differences in the DOS and host file permissions that can be visible to users. This is especially true when using the AIX operating system **chmod** command to change host permissions to control certain types of file sharing.

If file permissions are set in a particular way by using the **chmod** command and then the file is updated by using almost any DOS program, the **chmod** operation must be repeated. This is because most DOS programs perform updates by renaming the existing file and then creating a new file with the updated contents of the original file.

problem-solving tools

The new file is created with default permissions according to the AIX operating system **umask** variable, which is set when the Access program is started up. A common default for this variable sets all permissions to read and write for files and to read/write/execute for directories.

No: Continue with the next step.

8. Is there a directory on the virtual drive that you cannot access or write to, or whose permissions appear to change?

Yes: A confusing situation can occur when the Access program users access directories for which they have execute permission but do not have read permission. If the programs or files they are accessing are opened with a DOS open system call, the open succeeds but a directory search for a file fails. Some applications perform directory searches even when they don't need to, which results in certain programs failing to open files if the user doesn't have read permission for the directory.

No: Continue with the next step.

9. Are you unable to perform certain operations using the DOS CHMOD or ATTRIB command?

Yes: AIX operating systems do not support the DOS SYSTEM and ARCHIVE attributes. They also do not allow you to change the HIDDEN and VOLUME attributes on files on the virtual drive. You may only do this on DOS files stored on local drives. All other attributes work correctly with the DOS CHMOD and ATTRIB commands.

Move any files you need to change using DOS CHMOD to the local drive and perform the action there.

No: Continue with the next step.

10. When using the DOS BACKUP command on a virtual drive, do you get unexpected results?

Yes: Because of the nature of AIX operating systems, the BACKUP command works differently on a virtual drive than on a local drive. Because of this, we do not recommend you use the BACKUP command on the virtual drive. Use AIX operating system backup utilities.

No: Continue with the next step.

11. Are you getting messages like "cannot create file," "cannot open file," or "file not found," or do you find that you cannot execute a file on the virtual drive?

Yes: These messages may result from several different problems.

You may be out of disk space. Use the AIX **df** command to determine if this is the case. If so, you must remove some files from your disk.

You may be trying to create or remove a file in a directory for which you do not have write permission. Note that you may be doing this indirectly if you are using an application that needs to create temporary files as part of its operation. Check the permissions of the directory you are working in. If necessary, change directories or change the permissions of the current directory. See "AIX Operating System File Permissions" in Chapter 2 of the *AIX Access for DOS Users User's Guide*.

No: Continue with the next step.

12. Do you see a file on the virtual drive, but when you try to access it you get a "File locked" or "Access denied" message *or* do you find that another user is able to access a file that should have been locked?

Yes: If other users are logged in to the Access program when this happens, you are probably unable to access the file because another user has opened it with an application that locks the file. In this case, you must wait until the other user has finished and the file is closed before you can access it.

However, if no other users are logged in and you get one of these messages, there may be something wrong with record locking. For assistance in diagnosing and correcting the problem, see "Problems With Record Locking" later in this chapter.

No: Continue with the next step.

13. When using the virtual drive, do you see miscellaneous error messages that appear to be incorrect?

Yes: Some DOS programs perform operations that cannot be supported by the Access program. For example, there are BIOS functions that perform read and write of physical disk blocks. These operations cannot be mapped into corresponding operations on a remote volume. Programs that attempt to do this produce an error diagnostic. Fortunately there are only a small number of programs used today that do not operate correctly under the Access program. Use the section on "Problems With Normal Operations" to isolate this type of error.

No: Continue with the next step.

14. Have you changed the date and time on your personal computer, but files created later still show the old date and time?

Using the DOS DATE and TIME commands only changes the date and time on your personal computer. It does not reset the host clock. Files created on the virtual drive take the host system date and time, not the DOS date and time.

If you need to change the date and time for the host system, do so in the host environment.

No: Check Appendix B of the *AIX Access for DOS Users User's Guide* to see if the error you are investigating is explained. Also see "DOS Software Compatibility Issues" in Chapter 4 of this manual and check the *Release Notes* accompanying this manual. If the error is not explained in any of those places, refer to "Problems With Normal Operations," later in this chapter, to determine whether or not your problem is related to the Access program.

Problems With NLS Capabilities

This section describes the error messages and problems that can occur if the Access program is not set up correctly for NLS capabilities. Use the following procedure to determine if this is the cause of the problems you are having.

1. Was the message "*prog_name*: Can't push domain *domain_name*, lmf_errno *lmf_errno*" displayed?

Yes: The Access program cannot find the language message file (LMF). This may be because the LMF is corrupted or not in the specified path. Look at your AUTOEXEC.BAT file. The LANG environment variable tells you what language you are using, and the NLSPATH environment variable points to the location of the LMF required for that language. For example:

```
SET LANG=Fr
SET NLSPATH=c:\pci\%%N\%%L.%%C
```

In this example, LANG is set to Fr, for French. The %N variable represents the location of language message file, DOSMSG, by default and the %C variable represents the DOS code page being used. The %L is a variable for the language being used, French, so the LMF would be called FR.LMF. If this file is not located in \PCNDOSMSG, get a copy of it from the appropriate Access program distribution diskette. If the file is there and you still have the problem, it may be corrupted. Try reinstalling the Access program. If the problem still occurs, contact your Access program vendor.

No: Continue with the next step.

2. Was the message "cannot open translation table *input_table_name*," "Invalid translation table," "Translation table(s) bad!" or "Translation table not found!" displayed?

Yes: The translation table may be missing or corrupt, in which case follow the procedures described in Step 1 of this section.

The translation table cannot work with your display. Monochrome and CGA displays only support the PC code page 437, which is the default, so if you are using a monochrome display, the only translation table you can use is PC437.LCS. Your personal computer must have a VGA or EGA display in order to use code page 850.

No: Continue with the next step.

3. Do file names get mapped after you use the CHARCONV, DOS2AIX, or AIX2DOS command?

Yes: The code page your personal computer uses does not support the characters used in the file names. This also causes asterisks to appear inside of text files.

No: Continue with the next step.

4. Was the message "Unknown translation error: *lcs_errno*" displayed?

Yes: Write down the error number (*lcs_errno*) and report it to your Access program vendor.

5. Are you having problems using CHARCONV, DOS2AIX, or AIX2DOS on file names that begin with a minus sign (-)?

Yes: CHARCONV, DOS2AIX, and AIX2DOS interpret the - as an option. To prevent this, precede the file name with two minus signs, (--), separated by spaces, as follows:

```
dos2aix -i pc437 -- -filename
```

No: Continue with the next step.

6. Are some characters not printing on your screen during an EM2 session?

Yes: DOS code page 437 cannot display all of the characters in code set 8859. Check that you have DOS 3.3 or later loaded on your personal computer and that you are using either an EGA or VGA display; then change to code page 850.

No: Continue with the next step.

7. Did the message "COUNTRY environment variable not set, using 1" display on the host system?

Yes: You have not set the **COUNTRY** environment variable for translations using **convert**, **dos2aix**, and **aix2dos** on the host. **COUNTRY** is set to 1, the USA code set, by default. To change the **COUNTRY** environment variable to another language, for example, German, type the following at the host prompt:

```
COUNTRY=49
export COUNTRY
```

8. Was the message "CODEPAGE environment variable not set, using <code_page>" displayed?

Yes: You did not specify the **CODEPAGE** environment variable, so the default code page translation table, pc437, is being used.

No: Check Appendix B of the *AIX Access for DOS Users User's Guide* for any other NLS-related errors. If you cannot find an explanation for the problem, contact your Access program vendor.

Problems With Record Locking

There are several ways in which record-locking shared memory or files can become corrupted or otherwise damaged. For example, the kernel may lose a shared memory segment or semaphore, which corrupts the shared memory but may or may not affect user files. Alternatively, a signal that the server cannot catch (such as **kill -9**) can terminate the server process. If this happens, locks may be left on, potentially making files or records inaccessible.

Another way files can be damaged is if a user issues the **DOS COPY** or **BACKUP** command on a virtual drive file being accessed by another user through an application that uses record locking. The user receives a DOS error message indicating that no copy was made; however, a partial (and therefore corrupt) version may actually exist.

Some possible indicators of shared memory corruption include:

- A file seems to be locked, but no other users are logged in.
- Access to a file is allowed when the file should be locked.

If shared memory is corrupted, the solution is to remove it. Once the shared memory is removed, the system automatically creates new, uncorrupted shared memory. The procedure below describes how to remove shared memory.

Warning: Be sure all Access program users are logged out before you proceed; otherwise, file damage may result.

1. Request that all Access program users log out.
2. Type:

```
ps -ef
```

to make sure that all processes whose names start with **pci** are gone.

3. Making sure you are logged in as root, execute the following command:

```
/usr/pci/bin/sharectl -r
```

This command removes shared memory. The system can now create new, uncorrupted shared memory.

If removing the shared memory does not solve your problems with file sharing and record locking, contact your Access program vendor.

Problems With Normal Operations

This section addresses problems that occur during an established Access program session. A procedure is provided in this section for determining if your problem is indeed an Access program problem.

If your problem is with one of the utilities provided with the Access program (other than PCIINIT, LOGIN, and EM2), read the appropriate section in the *AIX Access for DOS Users User's Guide* that describes the utility. The Access program internal problems are the main focus of this section.

Most Access program operation problems fall into two main groups—problems that are caused by the Access program and problems that are the result of the presence in memory of the Access program. The basic approach to isolating your problem is to re-create the conditions that produced the problem, but without the Access program software being present. If this test passes, try again with the Access program present but not active. Use the procedure below as a guide for doing these tests.

Before you continue, carefully note the steps that led up to the appearance of the problem when running your application program. You will be repeating these steps later.

problem-solving tools

1. Copy to a DOS disk all the files that were in use when the problem occurred. This may include data files, DOS programs, and configuration files. The DOS disk can be a diskette or a fixed disk. We call this disk the test volume.
2. Disable the Access program, as follows:
 - a. Make a copy of CONFIG.SYS, so that you don't lose your original file. Using any text editor, remove the following two lines from the CONFIG.SYS file:

```
device = bridge.drv  
device = driver.drv
```

driver.DRV represents the Access program device driver. (Note: This line may not be there if the Access program is being used over RS-232 only.) There may also be directories specified for the devices; for example, you might see:

```
DEVICE = \PCI\DRIVERS\BRIDGE.DRV
```

- b. Make a copy of AUTOEXEC.BAT so that you don't lose your original file. Edit AUTOEXEC.BAT using any text editor and remove the following line:

```
pciinit
```

3. Fix the path or environment. If the path or any environment variables are set to use the virtual drive, they must be changed to reflect the locations of the files you moved to the DOS test volume. This may require changes to AUTOEXEC.BAT or other configuration files, or changes to the manual procedure that you go through to run the program. Below are some examples of things that are likely to change. There may be other changes that are not listed below but are specified in the application program manual.
 - a. Display your path. Does your path contain references to the virtual drive? **Yes:** Set your path as follows:

```
path=n:dir1;m:dir2 ...,
```

where *n* and *m* are drive specifiers not on the virtual drive, and the *dir* entries are directories where you want the command line processor to search.

No: Continue with the next step.

- b. Depending on your application program, you may need to have all the data files in the same directory as your application program. This directory may need to be on your current drive. Are all programs and data files for this test located on the test volume so that they can be found using the path?

Yes: Continue with the next step.

No: Correct the path or move the program or data files appropriately.

4. Now reboot DOS without the Access program and confirm that it is not present by noting whether there are any banners displayed during the boot process that say "AIX Access for DOS Users." If any such banners appear, something was not done in the steps above and should be corrected before proceeding.
5. Now perform the sequence you noted earlier that produced the error. Is the error still present?

Yes: The error has nothing to do with the Access program, and the user should determine if the error is in the application program or in DOS itself. This is best done by referring to the trouble-shooting sections of the application program manual or by referring to the *Guide to Operations* for your personal computer. **No:** If the error does not occur, the problem is either in the Access program or because the Access program is present but not actually responsible for the error. The latter case can occur if programs or devices disregard DOS guidelines or sound programming practices. Continue with the following steps to determine which is the case.

6. Test whether the Access program presence causes the error, as follows:
 - a. Restore the CONFIG.SYS file to its original contents by copying the file you saved back on to CONFIG.SYS.
 - b. Restart the system, noting that this time banners should appear for the device drivers that are installed as part of the Access program. However, no banner should appear that says that the Access program has been initialized.
 - c. Do not run the PCIINIT program from the AUTOEXEC.BAT file or manually, since this would activate the Access program.
 - d. The Access program is now present in the system memory but is passive. It has no effect on the system other than taking up a certain amount of memory.
 - e. Now perform the sequence that produced the error.

Is the error still present?

Yes: The DOS program that fails in this case (but succeeds when the Access program is NOT resident in memory) is written incorrectly but may work without the Access program. Some programs depend on being loaded at certain absolute memory locations. Adding DOS drivers, the drivers, the Access program program, or TSR programs to memory can cause such programs to fail.

No: If you have not made any mistakes, you have found an Access program problem and should contact your Access program vendor. Please be prepared to give the vendor all relevant information concerning the problem.

Debugging Tools

The Access program provides you with two tools to help trace communications between a host and a personal computer: the DOSWHAT and PCIDEBUG commands.

The DOSWHAT command behaves like the standard AIX **what** command, except that it executes under DOS and operates on DOS or AIX files on either a terminal emulator or a local drive. Running the DOSWHAT command displays identifying information such as the release number and the compilation date contained in specified files.

The PCIDEBUG command controls log output of the Access program executing on the host. PCIDEBUG generates formatted debug output for all activated channels and sends it to the host log file. Output is generated only if at least one channel is enabled.

For more information on the use of the DOSWHAT and PCIDEBUG commands, refer to the command summary in *AIX Access for DOS Users User's Guide*.

Appendix A. AIX Access for DOS Users Messages

This appendix lists all Access program host messages that the administrator might see. During execution of the Access program, the error logger (`/usr/pci/bin/errlogger`) mails messages to root on the host system and also displays them on the host system console.

Each message description is accompanied by an explanation of the cause of the message and a recommended response. In the messages, italics denote generic information for which the system substitutes actual values. For example, *device name* in a message is replaced by the name of an actual device, and *amount* and *n* are replaced by numbers.

The abbreviation *errno* stands for an AIX operating system error number. When an error number appears in an Access program message, it means there was an error condition reported by the underlying host system. To determine the cause of the problem, consult the list that correlates the error number with a description of the cause. On many systems this list is on-line in the file `/usr/include/sys/errno.h`. If your system does not have this file, consult your host system documentation.

The Access Program Execution-Time Messages

These are messages that can be seen during execution of Access program.

- Cannot create message queue ID, *errno* = *errno*
- Cannot create semaphore, *errno* = *errno*
- Cannot create shared mem segment, *errno* = *errno*

Explanation: If *errno* is ENOSPC, the host system has run out of the specified resource.

Response: Reconfigure the kernel for more of the specified resource. If *errno* is a number other than ENOSPC, contact your Access program vendor.

- Cannot create logger `/usr/pci/bin/errlogger`

Explanation: A serious or fatal error has occurred in the Access program, but the error-logging program could not be invoked.

Response: Contact your Access program vendor.

- Cannot find hostname *hostname* in `/etc/hosts`. PCI aborting.

Explanation: This happens when the Access program is started if the `/etc/hosts` file does not include the name of the host on which the Access program is being started.

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Response: The system administrator should add the host name and internet address to the `/etc/hosts` file.

- **Can't exec DOS server `'/usr/pci/versions/3.2/pcidosvr.ip'` : *errno***

Explanation: The `pciconsvr` could not start the `pcidosvr` process.

Response: Check that the file `/usr/pci/versions/3.2/pcidosvr.ip` exists and has execute permission for all host users. The personal computer user should try logging in to the Access program again.

- **Can't exec `/usr/pci/versions/3.2/pcidosout.ip`: *errno***
- **Can't exec `/usr/pci/pcidosout.232`: *errno***

Explanation: This is a terminal emulation error. The `pcidosvr` could not start the `pcidosout` process.

Response: Check that `/usr/pci/versions/3.2/pcidosout.ip` or `/usr/pci/versions/3.2/pcidosout.232` exists and has execute permission for all host users. The personal computer user should retry terminal emulation.

- **Can't initialize record lock data *description_of_data***

Explanation: The record locking data described cannot be initialized.

Response: Clear the shared memory, using the procedure described in "Problems With Record Locking" in Chapter 6. If the problem persists, contact your Access program vendor.

- **Can't open network – Bye**

Explanation: This is an Access program initialization problem. The `pciconsvr` tried to open the network for normal Access program communication and failed. The Access program files are probably corrupted.

Response: Check that all the Access program files are installed properly, are accessible, and are not corrupted. If necessary, remove and reinstall the Access program host software. Restart the Access program by invoking `/etc/rc.pci`.

- **Connection server can't open network**

Explanation: The Access program connection server (/usr/pci/bin/pciconsvr.ip) could not open a network port. The most likely cause is that the port is already open because the connection server is already running. Only one connection server process can be running on a host.

Response: None required. Do not try to execute the connection server when it is already running.

- **Couldn't enter segment**

Explanation: An operation on shared memory failed during an attempt to establish a terminal emulation session. Note that this problem is *not* related to record-locking shared memory.

Response: The user should retry terminal emulation. If the problem persists, contact your Access program vendor.

- **Error getting current working directory**

Explanation: The Access program login over RS-232 failed because the host system call `getpwuid` or `getuid` failed.

Response: Verify that the user has a valid host account, including a proper entry in `/etc/passwd` and a home directory. The user should try to log in again.

- **Error *errno* on `get_tty`**

Explanation: The initialization of the terminal port for terminal emulation over RS-232 failed.

Response: Refer to the reported error number for a precise description of the problem. Take appropriate action to restore host system resources.

- **Error *errno* on `STDIN set_tty`**

Explanation: An attempt to set terminal modes on the serial port failed.

Response: Refer to the reported error number and take appropriate action.

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- **IO ERROR ON PIPE.***error errno*

Explanation: This is a terminal emulation error. An error condition on the pipe between the **pcidossvr** and the **pcidosout** process has occurred.

Response: Retry terminal emulation.

- **memory:** Can't get *amount* bytes
- **memory:** Can't resize to *amount*

Explanation: The Access program server process cannot allocate memory required for its tables. The host system call **malloc** failed.

Response: Retry the operation. If the problem persists, the system may be in an unstable state and should be rebooted.

- **PIPE Read error:** *errno*

Explanation: This is a terminal emulation error. There was an I/O error on the pipe between the **pcidossvr** and the **pcidosout** process.

Response: Refer to the reported error number and take appropriate action to restore system resources. Retry terminal emulation.

- **PTY Read error:** *errno*

Explanation: This is a terminal emulation error. The **pcidosout** process encountered an error when trying to read from the **pty**.

Response: Check the reported error number for the cause of the problem and take appropriate action to restore system resources. Retry terminal emulation.

- **Too many reXMITS**

Explanation: This is a terminal emulation error. The **pcidosout** process tried to transmit data to the personal computer, but the personal computer did not acknowledge the transmissions. The terminal emulation process is therefore terminated.

Response: Retry terminal emulation.

- **TTY Write error:** *errno*

Explanation: This is a terminal emulation error. The terminal emulator tried to write to a terminal device and failed.

Response: Refer to the reported error number for the cause of the problem and take appropriate action to restore system resources.

- **vfInit:** Can't calloc (*number, number*) for vfCache.

Explanation: The Access program was unable to allocate memory for an internal data area. This is a problem with AIX operating systems, not with the Access program.

Response: Retry the operation. If the problem persists, your AIX operating system may be in an unstable state and should be rebooted. Alternatively, your AIX system may be running out of memory.

- **Probe timeout-disconnect dev *names*, pid *n***

Explanation: A personal computer has disconnected from the host without logging out. The host has killed the Access program processes associated with this personal computer.

Response: None required on the host. This condition is fatal for the personal computer. To re-establish a host connection, the user must log in again.

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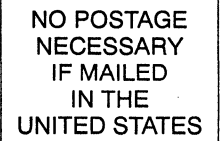
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